The “Motion” and “Action” of Speech: Quantum Physics in the Rhetorical Theory of Kenneth Burke

**Introduction**

Quantum Physics is a science fond of thought experiments and extended metaphor. Schrödinger's Cat, a perennial favorite thought experiment among physicists, poses a question about when exactly our perceived reality corresponds to reality on a subatomic scale. Schrödinger's original statement of the thought experiment is quite dull, hardly worth mentioning for its cleverness or wit, yet it has taken hold in popular culture through both fictionalized accounts of the experiment and through the work of public intellectuals. Novelist and philosopher Robert Anton Wilson wrote a trilogy of novels exploring theories relating to quantum mechanics, and Stephen Hawking and Michio Karu have both been on-camera delivering engaging retellings of the thought experiment.

Thought experiments such as Schrödinger's Cat are useful learning mechanisms for understanding physics, the science of the universe’s inner workings. Such a fundamentally important science is bound to capture the attention of some people with generally inquisitive minds, and its ease of use with metaphor makes it digestible for rhetoricians, who play with words professionally. In this project, I locate the discursive traces of physics discourse on Kenneth Burke’s language regarding rhetoric. For Burke, physics is a toolbox of terms, with some of his key theoretical insights expressed in the language of physics. I argue that physics
provides tools for speaking about rhetoric because of the unseen nature of its object. While the effects of both speech and physics can be perceived, the processes through which they work are hidden from easy perception.

Due to the scope of this project, I have chosen to focus on 2 of Burke’s seminal essays: “(Nonsymbolic) Motion/(Symbolic) Action” (1972) and “Questions and Answers About the Pentad” (1978). In both of these essays, I will show how Burke’s use of the language of physics informs his understanding of how rhetoric operates in the world. In a longer format, I could explore additional works of Burke’s, and I have noticed the language of physics at work in other seminal works of 20th-Century Rhetorical Theory, including in I A Richards and in Chaim Perelman. For this essay, however, I will focus on the two essays I mention above. Kenneth Burke is such a crucial touchstone for American rhetoricians that I believe he offers the best case for my argument, which is that rhetoricians’ understanding of physics inform the way in which they think and write about rhetoric.

Ultimately, my goal here is to make a claim about the history of rhetorical theory, that 20th century rhetorical theorists, despite their claims to reject scientific positivism, are nonetheless taking up the language of physics when describing the functions of rhetoric. This contradiction is heavily present in the writings of Kenneth Burke, who will be my initial case study in showing links between physics and rhetorical theory. My argument is not that using terms from science undermines Burke’s thought, but rather that we must be aware of how the ideology of science leaks into our own work in rhetoric. If a word from physics best describes a function of rhetoric, we need to explore why that is the case. The Rhetoric of Science literature picks apart the ideological qualities of science, digging into how science presents itself as
absolute knowledge. We need to do the same in rhetoric, questioning why we use the figures we
do and how those terms betray some ideological investment similar to that of the physicist.

After exploring my rationale in more depth, I will show the reader where my project fits
within the fields of Burke scholarship and the burgeoning field called the Rhetoric of Science.
While my project intersects with these two fields on the margins, I am offering a new
contribution that can deepen our understanding of both Kenneth Burke and rhetoric’s
relationship to physics. Both of these connections feed back to my larger point: that
20th-Century Rhetorical Theory has a complex relationship with physics that can be traced
through the physics terms used by prominent rhetorical theorists. Then, I will move directly to
Burke’s words, conducting a content analysis of the chosen essays, pointing out where Burke
uses terminology borrowed from physics to describe rhetoric. I have divided Burke’s use of
physics into three groupings which I will discuss separately: Motion/Action, Polarity, and
Entanglement.

**Rationale: Why Physics?**

“Schrödinger's Cat,” “String Theory,” “Heisenberg’s Uncertainty Principle,” and “Many
Worlds Theory” are the most common phrases that appear in popular culture in relation to
quantum physics. The relative popularity of quantum physics is due to its able use of metaphor in
relation to its applications. The functions of physics calculations are high-order mathematics.
Unlike Plant Biology or Electrical Engineering, which can produce workforce-ready
professionals with a BS degree, Physicists that study Quantum Physics must train for years
beyond the Bachelor’s level to prepare themselves to work in a lab. Since their work is so
mathematically intense, Physicists must, as a matter of course, engage in metaphorical
explanations of their abstract formulae, and these metaphors are apprehensible to people who are not trained scientists. Moreover, these metaphors explain the hidden forces that, despite their imperceptibility, govern the rules of day-to-day life. These metaphors can have interesting rhetorical implications. Consider the following experiment conducted by Lemos, et al.

In the experiment, a photon, the very stuff of light, is sent down a path that diverges at a crystal. The crystal splits the photon in two, but the two particles remain “entangled,” subatomically linked through time and space. One of the pair of photons reaches the end of its path at the cardboard cutout of a cat, illuminating its surface on a computer screen that traces the path of both photons. The other photon reaches the end of its path, where there is no cardboard cutout, yet the computer screen tracing the path of the cat-less photon shows an identical image of a cat. In short, one photon retained information from its “entangled” partner, even though they were explicitly separated from one another. In defiance of the laws of common sense, a photon contained intelligible information about a place it had never been.

I see an interesting parallel between this experiment and the path of an act of rhetoric from speaker to audience. The rhetoric, once conveyed to the audience(s), will form a number of reflections of the speaker’s words. A portion of these reflections would be a direct result of the speaker’s words, representing the denotative value of the rhetoric. Another portion of the reflections would be filled in by a number of factors, including connotative meanings, personal experiences, and semantic slippage, among a host of others. These other factors, though not intentionally activated by the speaker’s words, are summoned through a series of cognitive and affective connections, becoming entangled with the speaker’s words to an inseparable degree. Though the rhetoric may have a specific purpose in the mind of the rhetor, no one can ever
account for the indirect connections made through the act of interpreting text. Like the image and its negative in the photon experiment, rhetoric activates responses that can seem unconnected, yet are linked in the inner worlds of the audience(s).

I would suggest that Physics, which attempts to trace and categorize the unseen (yet felt) effects of the universe upon the lives of humans, has a kindred spirit to our own study of rhetoric, which attempts to trace and categorize the unseen (yet felt) effects of communication upon the lives of humans. I’m not claiming a direct analogy between the two fields, but I see similar motivations regarding the analysis of the invisible hands that construct visible regimes. I would not be the first to make metaphors relating rhetoric to physics, and I would certainly not be the first to use the language of physics to describe the action and effects of speech. Indeed, by using the terms “action,” and “effect,” I am falling into the scientific register, tipping my hat to the fundamentality of the scientific method in Western academic discourse.

The field of quantum physics, with its focus on probable knowledge based on a series of formal proofs, aligns well with Aristotle’s concept of dialectic as laid out in his *Rhetoric*. The counterpart to dialectic, of course, is rhetoric, and quantum physics, as the dialectic quantitative science of our time, has influenced rhetoricians, who use its principles and terminology to explicate their theories of rhetoric. Kenneth Burke is an example of this influence, but before turning to his work, I would like to walk the reader through the conversations surrounding my claim.

**Lit Review**

What I’m trying to do is in many ways the inverse of the literature dubbed Rhetoric of Science. Scholars such as Jeanne Fahnestock, John Angus Campbell, and Alan Gross have
looked extensively at how rhetorical figures are deployed in scientific discourse, and while their work is excellent, it’s not in line with my own research question. Their work is concerned with how scientific knowledge presents itself rhetorically as objective fact, rather than socially-constructed. I want to look inward on the discipline of rhetoric, seeing how shifts in the understanding of quantum physics have influenced the language of rhetoricians. This project may be seen as a corollary to the Rhetoric of Science work, but internally-directed to the field of rhetoric.

There are a handful of articles that seem closer to what I’m doing, though few have received much attention. A piece from Theresa B. Dykeman entitled “The Physics of Rhetoric” places rhetoric within a framework of physics, but hers is more of an experimental methodology piece than mine, which is a content analysis of rhetorical scholarship. Nathan Crick published a paper in 2014 that offers the same meta-level analysis as my project, but his is aimed at the Rhetoric of Science literature, while mine is aimed at 20th-Century Rhetorical Theory, specifically Kenneth Burke. Heather Brody Graves, in 1998, tackled the combination of rhetoric, science, and analogy, but her paper looks at the role of analogy in the Rhetoric of Science, whereas I argue that quantum physics gives rhetoricians useful tools for talking about rhetoric.

The closest thing to my project I’ve been able to find is Randy Harris’ 2013 “position piece” (1) that begins with all the same pieces I’m working with. He brings up the “science of Symbolism” tradition of Richards, claiming that, “every generation or two, some rhetorician wants to put on a lab coat and declare rhetoric a science.” A hilariously apropos comment, considering he then puts on the lab coat himself and calls for a “cognitive rhetoric.” I don’t necessarily disagree, but that’s not what I’m looking for as an outcome in my piece. I want to dig
into the relationship between rhetoricians’ understanding of physics and rhetoric, not advocate for a new physics-based rhetoric. Another article in this vein in Jon Sung-Gi’s fascinating 2011 piece, “Toward Wave Rhetorics for Scholarly Communication in Human Sciences.” Sung-Gi calls for an entire rhetorical theory based around “particle rhetorics” and “wave rhetorics,” and this paper is fascinating for its insight into the differences in the Eastern and Western rhetorical traditions.

There is also a large community of scholars who study Burke to whom I think this project will be of interest. Much of the work done on Burke in rhetoric revolves around his ideas of dramatism, though he is frequently deployed in Composition Studies and Religious Studies as well. Among the recent projects to deal with Burke include Debra Hawhee’s 2012 book *Moving Bodies: Kenneth Burke at the Edges of Language* and Laurence Coupe’s *Kenneth Burke: From Myth to Ecology* (2013). There is a journal published by the Kenneth Burke Society, and he is frequently mentioned in major rhetoric journals such as *Philosophy of Rhetoric* and *Quarterly Journal of Speech*. A great deal of work done on Burke traces the impact of his theories on later writers and social movements, but relatively little attention has been paid to Burke’s relationship with the sciences.

Burke was famously a voracious reader on many topics, and he famously spoke out against Behaviorism and Scientific Positivism. Andrew Kidd broached the topic in 2011 with an article in the Kenneth Burke Society’s journal regarding Burke’s anti-positivist attitude. His argument concludes with a call for more interdisciplinary conversations between scientists and humanists (“Conclusion”). Kidd’s paper looks at Burke’s influence on the contemporary Philosophy of Science, which is also present in David Hildebrand’s 1995 paper exploring
elements of philosophical pragmatism in Burke’s writing. Again, these projects intersect with mine along some lines, but none of them approach Burke’s language in relation to scientific terms.

So, with those sets of literature covered, I have established that this type of inquiry is well-trodden ground, but I am offering a new way to look at Burke, and through Burke, 20th-Century Rhetorical Theory more generally. Better understanding our relationship with physics can point us to ways of improving our relationship with other sciences, ultimately promoting writing across the curriculum (or better-written STEM grants in Comm Departments for the cynic in all of us). Furthermore, throughout the 20th century, theorists like I A Richards, Wayne Booth, and Chaim Perelman have used terms from physics to describe rhetoric. I am looking at Kenneth Burke as an exemplar of 20th-Century Rhetorical Theory both because of the time he was most active (1930s-1980s) as well as his enduring popularity in contemporary rhetorical theory. In better understanding critical theorists’ use of scientific language, we can see the ideological force behind the application of scientific terms. By better understanding our own biases as theorists and critics of rhetoric, we can continually refine and improve our discipline.

**Motion and Action**

Starting with his *Grammar of Motives* (1945), Kenneth Burke began developing his theoretical distinction between “Motion” and “Action.” He would continue to refine and develop the specifics of this theory for the next few decades, and by 1972, he had condensed a great deal of the messy theory-building that appeared in *Grammar* and *Rhetoric of Motives*. His essay “(Nonsymbolic)Motion/(Symbolic) Action” contains an excellent description of his theory, and I will point out the ways his theory seems to be influenced by the ways those terms are used in
physics. Primarily, the term “Action,” as it is used in Quantum Physics, appears closely related to Burke’s understanding of symbolic action. I will address both terms individually before turning to how Burke uses them together and in opposition to one another.

First, Burke describes the realm of motion as “sheerly physiological” and being exclusively in “the realm of matter” (809). He says that motion deals with “a fish,” “a tree,” and, perhaps most telling, “one of B. F. Skinner’s operationally-conditioned pigeons.” Particularly with this reference to behaviorism, Burke is setting up the opposition between motion and action with clever terministic screens. By positioning behaviorism with motion, action is open to the reverse of behaviorism: Burke’s dramatism, which seeks to account for rhetoric as symbolic action. He then delivers on the implied opposition, defining the realm of action as including “modes of behavior made possible by the acquiring of a conventional, arbitrary symbol system.” This includes many facets of human experience, including “music, painting, sculpture, dance, highly-developed mathematical nomenclatures,” etc.

These categorical distinctions may seem repetitive, but Burke goes to great lengths to set up what is, at its core, an easy philosophical distinction: nature and man. Motion belongs with nature, with its physiological necessities and behaviorist models of existence. Action, on the other hand, implies a uniquely human force, creative and dynamic in form. In a telling move, Burke classifies geologic and meteorologic events as being a part of “motion” (811). This has important rhetorical implications, as it shows that the realm of motion would still function without the input of symbol-using humans. Action, therefore, has under its heading all the possible rhetorical acts performed by humans, and motion simply continues in its path, unchanged by the rhetorical force of man.
Motion, as it is used in physics, has important correlations to Burke’s use of the term. Motion, in physics, is used to refer to an object’s change in position in relation to time. When used in experiments, it requires a *frame of reference* to be useful. In physics, everything in the universe is considered to be in motion, so for motion to be useful at all in the human understanding of physics, we must assign it an arbitrary frame of reference. Outside the *symbolic action* of assigning a frame of reference to motion for an experiment, it is considered quite useless for the human understanding of the universe. In a similar way, Burke relegates all non-human understanding to the realm of motion, using it only as an anchor to float his real work, which is on “action” as symbolic intervention into a world of impersonal motion.

Before moving on to “action,” I want to address a strange detour regarding “motion” that Burke takes in his 1978 essay “Questions and Answers About the Pentad.” Near the end of the essay, Burke is talking about the evolution of humans, and drops this gem on the readers: “by evolving our kind of organism, the wordless Universe of nonsymbolic motion is able to comment on itself” (334). It’s a dangerous game deciding how seriously to take Burke when he deploys religious imagery. Some of his work takes religious concepts very seriously, and other parts of his bibliography are hilariously tongue-in-cheek regarding God and theology, so I don’t want to put much stock in his anthropomorphized universe that wishes to see itself commented upon. It is implied here, though, that the realm of motion *can be* commented upon with some efficacy by the realm of action, which is fascinating to consider.

Action, which for Burke encompasses the entirety of human symbolic action, is an incredibly broad category. From his 1972 essay, he includes everything from dance to road maps in the realm of action (809), which is important to understand because of the dynamic nature of
action for Burke’s rhetorical theory. To assist in determining how symbolic action works, Burke developed the Dramatistic Pentad, which attempts to account for Act, Agent, Agency, Scene, and Purpose. As Burke points out in 1978, it is not the terms themselves which are important for understanding symbolic action, but more crucially the ratios between all these relationships (332).

The ratios between the terms are crucial for understanding the dynamic aspect of Burke’s theory of language. Not only must the terms themselves be identified, but the relationships between all the terms must be explicated as well. The same terms presented with different ratios uncover a different rhetorical situation, and a different kind of symbolic action emerges. Measuring the ratios between the different aspects of the Pentad is represented when Burke’s theory is seen as a pentagram, mapping the relationships between the different points on the chart. These dynamic relationships within the realm of action, when compared to the linear, static progression of motion, reveal more about Burke’s use of physics terminology when he describes the work of language.

“Action,” seen in the context of Quantum Physics, reveals a great deal about Burke’s use of both “motion” and “action” in his work. Action, in the context of physics, is the process of accounting for dynamic action in a physical system. Not only does action account for the dynamics of a physical system, it is used to calculate more stable “equations of motion.” The parallel to Burke’s notion of action is quite strong. Both attempt to account for dynamic action that fits within a larger, more paradigmatic schema, whether it be physics’ “equation of motion” or Burke’s “realm of motion.” To draw one more comparison, “action” is deployed in Quantum Physics when there are many moving parts of a system, and a scientist wants to determine the
relationship between those parts. I won’t belabor this point any longer, but I see direct
canctions between Burke’s use of “motion” and “action” to those terms in physics, including
the way they are connected, with action grounded in a larger system of motion. As Burke says in
1978, “no symbolic action is possible without a grounding in nonsymbolic motion” (330).

**Polarity**

“Motion” and “Action,” as I have already discussed, open up new fields for thinking
about rhetoric. Rather than confining rhetoric to the spoken word or to the page, Burke uses
language that highlights the *dynamic* aspects of symbolic action. This particular set of terministic
screens is further illuminated through Burke’s use of the language of polarity, which again
reflects the discursive traces of 20th-century physics. For this section, I will be looking at
Though his notions of “Motion” and “Action” are explored in greater length elsewhere, this
article provides a blueprint for his thoughts on this particular theoretical contribution.

The language of polarity permeates this particular article, contributing to Burke’s overall
theoretical project in a crucial way. Herein, he develops his distinction between “Motion,”
which represents “sheerly physiological” (809) human behavior, and “Action,” which includes
“such resources as a tribal language.” Developing this distinction was crucial to Burke’s theory
of rhetoric, within which he included types of symbolic action (such as music, dance, and road
maps) that were groundbreaking at the time. The scope of rhetoric has been a point of contention
in the discipline since ancient Greece, and Burke’s theoretical contribution paved the way for the
latter half of the 20th century’s explosion of new rhetorical criticism.
Burke describes the distinction between “Action” and “Motion” as a “basic polarity,” placing the pair alongside “mind-body” and “spirit-matter,” to name but a few (809). He mentions “polarity” numerous times throughout the paper (817, 819-820), stressing that “the concept of the Self must necessarily be defined in terms of a polarity” (814, emphasis in original). Polarity is an interesting relational figure to describe the division between Motion and Action, and its use in defining the self gives it a great deal of importance in this theoretical schema. Other relational figures, such as “duality,” “dialectic,” and “dichotomy” are used elsewhere to describe the classic Cartesian problem, but polarity exists outside the same family of terms.

“Duality,” “dialectic,” etc. all find their roots in Greek and Latin. The key here is the “du-” or “di-” morpheme, which links to the number two. “Polarity” is borrowed more or less directly from late Latin (OED Online), and refers to the geographic poles. Here, we can see the physicality of the language Burke uses when approaching classic philosophical problems. Rather than remain in the realm of the “du-” or “di-” terms that surround philosophical debate, Burke turns to language that describes the natural world. A “polarity” exists in geography, in magnets, and in quantum physics, while a “dualism” exists in the mind. Burke’s understanding of rhetoric has a physicality to it that necessitates his use of words like “polarity” and “entanglement,” rather than more philosophically-oriented terms.

Polarity, in the world of quantum physics, has been an important factor in experiments since the 1920s. Between 1924 and 1927, Wolfgang Pauli published a series of papers trying to account for the movement of electrons that could be inferred by their effects, but could not be seen. He concluded that an electron’s spin (its inferred effects) could be determined by
determining its polarity. A particle’s polarity, therefore, is a part of a system that has inferred, rather than visible, effects and has a \textit{tendency} toward one end of a spectrum. “Du-” and “di-” words have a powerful exclusionary effect. Something is \textit{either} A or B. Polarity, in contrast, describes a tendency to gravitate toward A or B. The use of “polarity” to describe what might otherwise be called a “dualism” or “dichotomy” is useful for Burke’s overall theoretical project: opening up what we consider to be rhetorical. A polarity allows for some forms of symbolic action to have more of a tendency to be rhetorical, while not completely closing the book on what is or is not rhetorical.

Burke returns briefly to explain his notion of “polarity” in his 1978 essay “Questions and Answers About the Pentad.” In that essay, he describes polarity as “terms…[which] imply each other” (335). This both clarifies and complicates how he describes polarity in 1972. It clarifies it insofar as he sees polar terms being part of a system wherein two terms are connected, but it complicates his previous explanation in the way it determines resistance between the pair of terms. This complication can be partially resolved by seeing Burke’s use of “polar” and “polarity” in relation to electron spin, as I described above. If his use of “polarity” were deployed in reference to magnetic or geographical polarity, then it would be using a natural system (motion) to describe a human symbol-use (action). If, however, we see “polarity” as a reference to electron spin, then Burke’s terms are consistent. Determining electron polarity in physics is ultimately guesswork and argument. A physicist infers effects and then describes the system in relation to those effects, assigning the term “polarity” to one of those inferred effects. That process is one of action, to use Burke’s term, and it lies within the realm of rhetoric. So, too, do “polar” terms, which imply one another like an electron’s spin implies polarity.
So it is not just that Burke uses terms from physics that appear elsewhere, as “polarity”
does in physics, magnetics, and geography. He also uses those terms in ways that are analogous
to the physics usage. “Motion” and “Action” in Burke both have links to their usage in physics.
His notion of “Polarity” is also closely-related to its deployment within physics. Finally, I will
discuss Burke’s use of “entanglement” in relation to Quantum Physics, where it is one of the
most important theoretical terms in the field.

**Entanglement**

Entanglement, in Quantum Physics, describes a state in which particles become
interrelated on the subatomic level. Once particles are entangled, something that affects one
particle will affect the others in the same way—even when those particles are separated by time
and space. Physics deals with complex systems, so it is common for one aspect of physics to
have effects on other aspects, and entanglement carries this interrelation to its natural extreme.
Interestingly, communication is one of the industries in which research on entanglement is most
active. Let me briefly explain why. If two particles can be entangled together, and one particle’s
state has a directly correlated effect on the other, then messages can be sent instantly across the
earth without the need for wires or cellular signals using computers that are entangled.

Entanglement, for Burke, is crucial for understanding the human animal holistically,
situating the human in the polar space between motion and action. In his 1972 essay, Burke
posits an important point regarding the link between action and motion in the human mind. He
claims that “The Self...confronts...the interrelationships among the manifold details of ‘reality’”
(817) performing the function of categorizing events into understandable, discrete packets. The
purpose of the Self, therefore, is mediating the experience of the individual “as both person and
physiological organism.” It is at the intersection, or as he calls it on page 818, the “entanglement” of motion and action that the self forms as a productive construct.

Again, understanding this deployment of “entanglement” in relation to physics goes back to Burke’s 1978 claim that action must be grounded in an understanding of motion (330). For Burke, “entanglement” here refers to the complex of conscious and physiological elements that come together to create the Self. What affects one must affect the other, for they are connected at the subconscious (subatomic) level. A change in one particle causes a necessary change in the other, and if we take seriously Burke’s claim that action must be grounded in motion, we see another link to the language of physics in Burke’s understanding of language.

Entanglement also helps to understand the connections in the Pentad better. The “ratios” between the five points of the system are a form of entanglement, shaping the overall reading of the pentad more than any of the data points collected individually (332). If one point in the pentad changes, it affects the other points in the system as well. If an understanding of physics is indeed implicated in Burke’s notion of the Pentad, then one of his most important theoretical contributions to the field of rhetoric is tied to physics through the particular terminology that he uses. Understanding these relations is crucial for understanding how science affects rhetoric. If our critical theorists are using physics to explain language, especially while setting themselves in opposition to Scientific Positivism, then we need to more critically examine the ideologies that inform rhetorical theory.

Conclusion

This project is just the tip of the iceberg for uncovering the discursive traces of Physics on 20th-Century Rhetorical Theory. Going back to I A Richards and moving forward into the
latter 20th century with Wayne Booth and Chaim Perelman, there are numerous examples of rhetorical theorists using the language of physics to describe how rhetoric functions. The Rhetoric of Science project provides an excellent justification for why we should continue to pursue this line of inquiry. They work to uncover how ideological formations lead to cultural acceptance of science as a valid means of truth-making.

Similarly, we need to understand how the ways we talk about rhetoric betray our own subconscious biases. Throughout the 20th century, a consistent theme in Rhetorical Theory has been its opposition to scientific positivism as a paradigmatic viewpoint. Despite the work of theorists like I A Richards and Kenneth Burke that decried positivism, their language is itself infected with scientific terminology. It is these intersections that we must read carefully to look for potential weak points in our arguments.

Physics traces the unseen (yet felt) effects that structure the world in which we live. Rhetoric attempts to do the same, but with language. By carefully interrogating how we use scientific terminology within the discipline, we can make more accurate accounts of the work of rhetorical action, taking into account how we view the natural world of motion through the lens of physics. To move forward, I would suggest looking at both I A Richards and rhetorical theorists that were active in the 1980s. Richards, working after WWI, was in a unique position in relation to physics, which was undergoing a major paradigm shift, with an accompanying shift in the language they sued. Similarly, in the 1980s, Quantum Mechanics became the new paradigm for physics research, and its discursive traces may have left a mark on those theorists whom we have not had 50+ years to study as we have with Burke.
Ultimately, understanding how rhetoric relates to science can be helpful for two main reasons. First, we can uncover contradictions between the 20th-Century Rhetorical Theorists’ rejection of scientific positivism while simultaneously using the language of science. This will help us to better understand and critically engage with the rhetorical tradition. Second, with a better understanding of science, we can more consciously use terms that we find analogous or helpful for understanding rhetoric. With this improved critical vocabulary, we can better explicate the effects of rhetoric that we feel on a daily basis.

Works Cited


Quantum Field Theory I. ETH Zurich, HS12. Chapter 4. Quantum Action. Let us briefly state how to represent this symmetry in the quantum theory where $Q = Na - Nb$ becomes a quantum operator. It is obviously hermitian. The notation in physics often does not distinguish between abstract Lie algebra generators $a$ and their representations $R(a)$, both may be denoted simply by $a$. Likewise the distinction between Lie brackets and commutators may be dropped (this is perfectly reasonable in a quantum algebra). In other words, the action of $(M, P)$ neither creates nor annihilates particles and will therefore maps $V_n \rightarrow V_n$. The representation on Fock space thus splits into representations on the individual $V_n$. 4.10.