

Rotating Elements in Early Lightning Protection: Bridging Diviš's 18th Century Innovation with Contemporary Wind Turbine Physics

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Abstract:

This study explores historical and physical parallels between the experimental lightning protection system developed by the Czech scientist and Premonstratensian Václav Prokop Diviš (1698–1765) and contemporary research on lightning interactions with rotating wind turbines. Diviš's 1754 "meteorological machine" incorporated rotating metal elements and multiple discharge points, aiming to neutralize atmospheric electricity and prevent storms—concepts that, although scientifically misunderstood at the time, display intriguing analogies with modern findings on the influence of rotation and surface geometry on electrical discharge behavior.

Through a comparative analysis of historical records, Diviš's treatise *Magia naturalis* (1765), and recent experimental studies in atmospheric electricity, the paper identifies two principal areas of correspondence. First, rotation-enhanced discharge phenomena, now well-documented in wind turbine research, appear conceptually mirrored in Diviš's use of wind-driven mechanical motion to influence electrical activity. Second, his implementation of multi-point discharge arrays anticipates aspects of today's dissipation array systems, though both approaches face similar limitations in overall effectiveness. While Diviš's apparatus failed to provide reliable lightning protection—largely due to poor grounding and overestimated protection range—its individual design components reflect a surprisingly advanced empirical understanding for the 18th century.

The results highlight how historical experimentation, and modern electrodynamics converge on shared physical principles, even when separated by centuries and differing methodologies. Diviš's work demonstrates the continuity of experimental reasoning in the study of atmospheric electricity and illustrates how early intuitive inventions can foreshadow mechanisms later quantified through scientific analysis.

This study contributes to the broader understanding of the evolution of lightning protection technology and the historical persistence of certain experimental paradigms. By bridging Enlightenment-era empiricism with modern scientific inquiry, it repositions Diviš's legacy within the long trajectory of electrotechnical innovation, emphasizing the enduring dialogue between past ideas and present discoveries.

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