Stellar Pulsation Theory From Arthur Stanley Eddington to Today *(Abstract)*

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Abstract While one could question that Eddington was the pioneer in theoretical work directly addressing the pulsating variable stars, there is no doubt that his work in the first part of the 20th Century set the stage for a transformation of theoretical astrophysics. After Eddington (the 1940s to the present day) stellar pulsation theory evolved from analytic theory into the realm of computational physics. Starting from Eddington's formulation, the flexibility provided by numerical solutions enabled exploration of systematics of pulsating variable stars in vastly greater detail. In this talk, we will trace this development that led to theoretical explanations of period-luminosity relations, new mechanisms of pulsation driving, connections with mass loss and stellar hydrodyamics, and to modern asteroseismic probes of the Sun and the stars.

King Charles' Star: A Multidisciplinary Approach to Dating the Supernova Known as Cassiopeia A *(Abstract)*

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Abstract Few astronomical phenomena have been as studied as the supernova known as Cassiopeia A. Widely believed to have occurred in the latter half of the seventeenth century, it is also thought to have gone unrecorded. This paper will argue that Cas A did not go unobserved, but in fact was seen in Britain on May 29, 1630, and coincided with the birth of the future King Charles II of Great Britain. This "noon-day star" is an important feature of Stuart/Restoration propaganda, the significance of which has been widely acknowledged by historians and literary experts. The argument here, however, is that in addition

the historical accounts provide credible evidence for a genuine astronomical event, the nature of which must be explained. Combining documentary analysis with an overview of the current scientific thinking on dating supernovae, the authors put forward their case for why Charles' star should be recognized as a sighting of Cas A. Finally, it will be argued that a collaborative approach between the humanities and the sciences can be a valuable tool, not just in furthering our understanding of Cas A, but in the dating of supernovae in general.

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The History of Variable Stars: a Fresh Look

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Abstract For historians of astronomy, variable stars are important for a simple reason—stars change. But good evidence suggests this is a very modern idea. Over the millennia, our species has viewed stars as eternal and unchanging, forever fixed in time and space—indeed, the Celestial Dance was a celebration of order, reason, and stability. But everything changed in the period between Copernicus and Newton. According to tradition, two New Stars announced the birth of the New Science. Blazing across the celestial stage, Tycho's Star (1572) and Kepler's Star (1604) appeared dramatically—and just as unexpectedly—disappeared forever. But variable stars were different. Mira Ceti, the oldest, brightest, and most controversial variable star, was important because it appeared and disappeared again and again. Mira was important because it did not go away. The purpose of this essay is to take a fresh look at the history of variable stars. In re-thinking the traditional narrative, I begin with the first sightings of David Fabricius (1596) and his contemporaries—particularly Hevelius (1662) and Boulliau (1667)—to new traditions that unfolded from Newton and Maupertuis to Herschel (1780) and Pigott (1805). The essay concludes with important 19th-century developments, particularly by Argelander (1838), Pickering (1888), and Lockyer (1890). Across three centuries, variable stars prompted astronomers to re-think all the ways that stars were no longer "fixed." New strategies were needed. Astronomers needed to organize, to make continuous observations, to track changing magnitudes, and to explain stellar phases. Importantly—as Mira suggested from the outset—these challenges called for an army of observers with the discipline of Spartans. But recruiting that army required

a strategy, a set of theories with shared expectations. Observation and theory worked hand-in-hand. In presenting new historical evidence from neglected printed sources and unpublished manuscripts, this essay aims to offer a fresh look at the history of variable stars.

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History of Variable Star Organizations