

Eddington, Lemaître and the discovery of the expanding universe

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Arthur Stanley Eddington was one of the most accomplished physicists, mathematicians and astronomers of his generation. An early proponent of the general theory of relativity in the English-speaking world, he played a leading role in the famous eclipse observations of 1919 that offered early evidence in support of the theory. Yet when he received a paper in 1927 from his former student Georges Lemaître suggesting that relativistic considerations led naturally to the notion of a universe of expanding radius – a hypothesis that could provide an explanation for the redshifts of the spiral nebulae – Eddington paid no attention.

In this presentation, we consider the reasons Eddington and others paid little attention to Lemaître’s hypothesis of a universe of expanding radius when it was first articulated. We find that several factors may have played a role in the oversight, from Lemaître’s status as a relatively junior researcher to his decision to publish in a little-known Belgian journal, from the mathematical complexity of relativistic cosmology to Lemaître’s reliance on observational data that were not yet well established. We argue that the latter issue may have been a significant factor for Eddington. It is not very well known that Lemaître’s 1927 determination of a mean redshift/distance parameter for the nebulae relied on nebular distances estimated from their apparent magnitudes, an indirect method that was prone to large uncertainties. Overall, we suggest that Lemaître’s article of 1927 constitutes an intriguing example of a brilliant scientific hypothesis that was slightly ahead of its time in terms of the interplay between theory and observation.