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Singularities in Semiclassical Cosmology JOSEPH NYHAN, College of the Holy Cross, ELENI-ALEXANDRA KONTOU, University of Amsterdam, DANIEL SIEMSSEN, University of York — The semi-classical Einstein equation (SEE) is an attempt to rectify the classical nature of Einsteins field equations in our quantum universe: the matter portion of Einsteins equation, the energy-momentum tensor, is quantized. This project analyzes which conditions today lead to a primordial singularity in the past within our universe in the context of the SEE. We use derived solutions of the SEE for a scalar field in an FLRW universe for our analysis. In this context, we define a singularity occurrence to be when the scale factor within the FLRW metric goes to zero. The investigation of the existence of singularities was performed by varying the initial conditions of a variety of parameters, checking simpler, bounding differential equations, and using analytical and numerical methods.

Joseph Nyhan
College of the Holy Cross

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