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The Physical Origin of the Feynman Path Integral ARMIN NIKKHAH SHIRAZI, University of Michigan, Ann Arbor — The Feynman path integral is an essential part of our mathematical description of fundamental nature at small scales. However, what it seems to say about the world is very much at odds with our classical intuitions, and exactly why nature requires us to describe her in this way is currently unknown. We will describe here a possibility according to which the path integral may be the spacetime manifestation of objects existing in a lower-dimensional analog of spacetime until they give rise to the emergence of spacetime objects under a process that is currently labeled a "Quantum Measurement." This idea is based on a mathematical distinction which at present does not appear to be widely appreciated

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