

Schrödinger's Alarming Phenomenon

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The big bang is a laboratory to explore the properties of particles that cannot be explored at terrestrial laboratories. In addition to thermal production of new particles, there is another source of cosmological particle production. In 1939 Edwin Schrödinger pointed out that particle-antiparticle pairs could be created merely by the violent expansion of space. The spontaneous appearance of particles from the vacuum so disturbed Schrödinger that he referred to it as an "alarming phenomenon." The phenomenon is now thought to be the origin of density fluctuations produced in inflation as well as a background of gravitational waves. Gravitational particle production is a rich phenomenon, which continues to be explored.