

# **An Act of Creation: The Meitner-Frisch Interpretation of Nuclear Fission**

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Abstract:

At the end of December 1938 Lise Meitner and her nephew Otto Robert Frisch, both victims of Nazi persecution, met in the small Swedish village of Kungälv to spend the Christmas holidays with Swedish friends. There, during a walk in the snow, it suddenly occurred to them that they could explain Otto Hahn and Fritz Strassmann's recent and puzzling experimental results with uranium on the basis of the liquid-drop model of the nucleus--a creative act that produced their entirely novel interpretation of nuclear fission. I aim to understand historically why Meitner and Frisch, and only Meitner and Frisch, arrived at this interpretation. This requires a detailed analysis of the origin and subsequent development of the liquid-drop model of the nucleus, from George Gamow's conception of it in 1928 and Werner Heisenberg's and Carl Friedrich von Weizsäcker's extension of it between 1933 and 1936, and the role it played in Niels Bohr's theory of the compound nucleus between 1936 and 1938. I show how these developments merged in the minds of Meitner and Frisch, leading them to their novel and influential interpretation of nuclear fission.