

Disorder magnetic system: Spin glass

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Abstract: The Nobel Prize in Physics for the year 2021 has been shared by three laureates for their ground breaking contribution to the understanding of complex physical systems [1]. While one half of the prize goes to Syukuro Manabe of Princeton university USA and Klaus Hasselmann of Max Planck Institute of Meteorology, Hamburg, Germany for their foundational work on “Physical modelling of Earth’s climate and reliably predicting global warming”, the other half goes to Giorgio Parisi of Sapienza University of Rome, Italy for his revolutionary contribution to the understanding of disorder and random phenomena in complex materials. Systems characterised by randomness and disorder are complex to comprehend. The principles underlying the observed behaviour of such systems are not clear. Giorgio Parisi’s best work was on disorder magnetic system– “spin glass”, which is a prototype complex system. This article delineates the subtle characteristic of spin glass as compared to ordinary magnets that we encounter in our day-to-day life and reflects the noteworthy contribution of Giorgio Parisi that brought him acclaim.

Keywords: Paramagnet, Ferromagnet, Symmetry breaking, Spin glass, and Frustration

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