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Understanding Cosmic Magnetism: a key science project for the Square Kilometre Array

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Understanding the Universe is impossible without understanding magnetic fields. They fill interstellar space, affect the evolution of galaxies and galaxy clusters, contribute significantly to the total pressure of interstellar gas, are essential for the onset of star formation, and control the density and distribution of cosmic rays in the interstellar medium (ISM). In spite of their importance, the origin of magnetic fields is still an open problem in fundamental physics and astrophysics. In this brief review I will summarize how we detect and study magnetic fields in radio astronomy and the role the SKA will play in solving the problems of Cosmic Magnetism.