Paper ID: 77926
student

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Gravity and Fundamental Physics (1)

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AN UPDATED FORMALISM FOR DEGRADATION OF NEUTRON STAR'S MAGNETIC FIELD.

Abstract

"For pulsars to glow for millions of years, a mechanism is required. "When a pulsar's period extends beyond a few seconds, the dilemma of what will happen to it, in the end, offers a number of potential solutions. It's possible that the neutron star's magnetic field, which was created when the degenerate stellar core of the pre-supernova star collapsed, decays over a period of around 9 million years. When the pulsar's period is decreased to a few seconds after some time, the magnetic field may not be adequate for supporting the pulsar's pulse mechanism, which causes the pulsar to shut down. It may also be solved by a system akin to a dynamo that revolves around the neutron star's core and crust rotating at different speeds, but only to a limited extent. The pulsar beam will deteriorate over time as it ages, even if the magnetic field does not correspondingly degrade. As the pulsar simply fades away from the view of the telescopes in this region, radio pulses may become too feeble to be detected. The debate now centers on the degradation of the magnetic field of neutron stars, despite the fact that both hypotheses are supported by observation. This paper analyzes the variations in the ohmic dissipation of the magnetic field crust caused by the dynamo-like mechanism. The theses establish how the different rotations of the crust and neutron star would affect the magnetic field, and we would attempt to tie it to the ohmic dissipation of the field crust. We now understand how pulsars generate internal fields, often known as field generation for short, which aid the evolution of magnetic fields in neutron stars. The research replaces the stress tensor, adds corresponding geometry, and adjusts the diffusion equation to achieve these goals. By doing so, we could better understand the Jones flux tube drift. Here, three main theoretical explanations—spindown-induced flux ejection, ohmic crustal field evolution, and diamagnetic field filtering by accreted plasma—are addressed. This study produces every possible pedagogical way to summarise the magnetic field of evolution and also tests some parts of the exotic physics and high energy physics in a pulsar environment which won't be possible to test on earth.