Plan Overview

A Data Management Plan created using DMPTool

DMP ID: https://doi.org/10.48321/D16W49

Title: FRG23-E: Particle-Particle Interactions in Ultra-High-Energy Cosmic-Ray Acceleration

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Template: Data Management Plan - AUS Funded Research

Project abstract:

Using equations and computational techniques I developed over part of the past twenty or so years to theoretically show that electrons and ions can be accelerated to GeV energies by subjecting them to high-intensity laser pulses, I managed recently to show that cosmic-ray particles can reach ZeV energy in the presence of huge magnetic and super-intense radiation fields. (1 GeV = 109 eV, and 1 ZeV = 1021 eV). Theoretical proof-of-principle of cosmic-ray acceleration by CARA (Cyclotron Auto-Resonance Acceleration) has recently been demonstrated [Y. Salamin, M. Wen, and C. Keitel, Astrophysical Journal **907**, 24 (2021) and Y. I. Salamin, Physics Letters A **397**, 127275 (2021)]. In these publications, rather idealistic conditions were employed (plane-wave radiation field superimposed upon the lines of a uniform magnetic field, and particles injected along that same direction). Such conditions may be present near the polar cap of a compact object like a magnetar, a neutron star, a blackhole, or as a result of a binary neutron-star and blackhole mergers. Mainly single-particle calculations have been conducted. Further work has also been done, or is in progress, to develop the idealistic model into a more realistic one. To those ends, many-particle simulations have recently been performed [Yousef I. Salamin, https://arxiv.org/abs/2106.05787 and Yousef I. Salamin, https://arxiv.org/abs/2106.08412]. This project will be devoted to such calculations, with the particle-particle interaction effects strongly emphasized.

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End date: 05-31-2024

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Data files and figures produced from the data.

On my network drive at AUS.

My data will not have any security concerns.

Data may be shared by email.

None is required.

Yes, on DSpace.
