#### PHOENIX-2023



Contribution ID: 34

Type: Talk

# Self-interacting dark matter and the GRB221009A event

Wednesday 20 December 2023 14:30 (15 minutes)

In this work, we explore the intriguing possibility of connecting self-interacting dark matter (SIDM) with the recently observed exceptionally bright and long-duration gamma-ray burst (GRB221009A). The proposed minimal scenario involves a light scalar mediator, simultaneously enabling dark matter (DM) self-interaction and explaining the observed very high energy photons from GRB221009A reported by Large High Altitude Air Shower Observatory (LHAASO) data. The scalar's mixing with the Standard Model Higgs boson allows for its production at the GRB site, which will then propagate escaping attenuation by the extragalactic background light. These scalars, if highly boosted, have the potential to explain LHAASO's data. Moreover, the same mixing also facilitates DM-nucleon or DM-electron scatterings at terrestrial detectors, linking SIDM phenomenology to the GRB221009A events. This manuscript presents the parameter space meeting all constraints and offers an exciting opportunity to explore SIDM in future direct search experiments using insights from the GRB observation.

## Designation

Student

## **Reference publication/preprint**

https://doi.org/10.1103/PhysRevD.108.083038

#### Institution

Indian Institute of Technology, Hyderabad

Author: SINGH THOUNAOJAM, Vicky (Indian Institute of Technology, Hyderabad)

**Co-authors:** BORAH, Debasish (IIT Guwahati); SAHU, Narendra (IIT Hyderabad); MAHAPATRA, Satyabrata (Sungkyunkwan University)

Presenter: SINGH THOUNAOJAM, Vicky (Indian Institute of Technology, Hyderabad)

Session Classification: Parallel: DM + neutrino