38th INTERNATIONAL CONFERENCE
ON HIGH ENERGY PHYSICS
AUGUST 3 - 10, 2016
CHICAGO

Contribution ID: **412** Type: **Oral Presentation**

Lattice Gauge Theory bounds on Composite Dark Matter (20' + 5')

Friday 5 August 2016 09:20 (25 minutes)

Models of composite dark matter, originating from a new strongly coupled dark sector, have a very interesting phenomenology. To make robust predictions in these models one often need to investigate non-perturbative effects due to the strong self interactions. Lattice field theory methods and numerical simulations are well suited for this task and contribute to a solid uncertainty quantification.
As an example, the Stealth Dark Matter model contains a candidate composite dark matter particle which appears as a bosonic neutral baryon of a new SU(4) strongly coupled gauge sector. The elementary constituents of this composite state carry electroweak charges. This construction provides a mechanism to naturally reduce the strength of dark matter interactions with standard model particles: there is no magnetic moment or charge radius. However such interactions exist and can allow direct detection and collider experiments to put constraints on the model. In order to get predictions from this strongly-coupled model, numerical lattice simulations are employed and give definite results for the cross-section of the dark matter candidate with standard nuclei in detectors, dominated by the electric polarizability interaction. A universal lower bound for the mass of this composite dark matter candidate is reported around 300 GeV.

Primary author: RINALDI, Enrico (Lawrence Livermore National Laboratory)

Presenter: RINALDI, Enrico (Lawrence Livermore National Laboratory)

Session Classification: Dark Matter Detection

Track Classification: Dark Matter Detection