



Contribution ID: 281

Type: **Oral Presentation**

Detecting Light, High-Energy, Low-Interacting Particles with FASER

Monday, 29 July 2019 14:34 (17 minutes)

The flagship LHC experiments are arranged radially outward from the proton interaction point, but dark matter mediators and other new light particles could be produced in a collimated beam by meson decays along the beam axis, and escape detection. FASER (ForwArd Search ExpeRiment) will explore this “blind spot” for the first time. The experiment will be sited 480 meters from the ATLAS interaction point, along a line tangent to the proton beams. Long-lived, weakly coupled TeV-energy particles can traverse the intervening rock and LHC infrastructure before decaying inside FASER, with little background from Standard Model processes. The collimated nature of the signal allows FASER to be compact, and re-use of components from other experiments allow it to be constructed quickly and inexpensively. FASER will be installed during the current LHC long shutdown and begin collecting data in 2021.

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Session Classification: Dark Matter

Track Classification: Dark Matter