## Phenomenology 2022 Symposium: From Virtual to Real



Contribution ID: 200

Type: not specified

## **Resonances in** $\bar{\nu}_e - e^-$ scattering at FASER $\nu$ and Forward Physics Facility

Tuesday 10 May 2022 15:00 (15 minutes)

I will discuss the resonant production and detection of charged mesons in existing and near-future neutrino scattering experiments with  $E_{\nu}$ 

*lesssim*<sup>1</sup> TeV, characteristic of high-energy atmospheric neutrinos or collider-sourced neutrino beams. The most promising candidate is the reaction  $\bar{\nu}_e e^- \rightarrow \rho^- \rightarrow \pi^- \pi^0$ . I will discuss detection prospects at FASER $\nu$ , the LHC's forward physics facility with nuclear emulsion (FASER $\nu$ 2) and liquid argon detectors (FLARE) and estimate the number

of expected resonance-mediated events in the existing data set of IceCube. In particular, dozens of events are predicted at the forward physics facility.

I will also outline possible detection strategies for the different experimental environments by identifying cuts with order one signal efficiency that

could potentially suppress backgrounds at FASER $\nu$ , yielding a signal-to-background ratio larger than 1. Antineutrino-induced s-channel meson resonances

are yet unobserved Standard Model scattering processes which offer a realistic target for near-term experiments.

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Session Classification: Flavor II