

Long-lived particles at the Japanese Spallation Neutron Sources

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The Japanese Spallation Neutron Source (JSNS) at J-PARC can provide an intense source of light new particles. We study the sensitivity of existing neutrino detectors to the decay in flight of light scalars, axion-like-particles, and heavy neutral leptons produced in pion and kaon decay at JSNS. We consider the near detector of the T2K experiment, ND280, where the fast, magnetized, gaseous argon chambers can be used to look for low-energy charged tracks in coincidence with the JSNS beam pulse and direction. For final states with muons and charged pions, we also consider the liquid-scintillator detectors of the J-PARC Sterile Neutrino Search at the JSNS (JSNS²) experiment, exploiting the double- and triple-coincidence nature of the signal. Finally, we also comment on the KOTO kaon detector and the possibility of looking for diphoton final states in association with JSNS beam pulses. The combination of these setups has the potential to improve existing limits by over an order of magnitude in some regions of parameter space, encouraging further study on data acquisition and background rejection by the experimental collaborations.

Poster prize

No

Given name

Matheus

Surname

Hostert

First affiliation

Harvard University

Second affiliation

Institutional email

mhostert@g.harvard.edu

Gender

Male

Collaboration (if any)

Primary authors: HOSTERT, Matheus (Harvard University); ARGÜELLES DELGADO, Carlos (Harvard University); URREA GONZÁLEZ, Salvador (Instituto de Física Corpuscular(IFIC) Valencia)

Presenter: HOSTERT, Matheus (Harvard University)

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