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Radioactive Loading for Sterile Neutrino Searches using Optomechanical Sensors

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The QuIPS collaboration is designing novel tabletop optomechanical sensors to search for evidence of sterile neutrinos in the keV to MeV mass range. This search will employ a levitated radioactive nanosphere, where nuclear recoils following decays within the nanosphere will transfer their momentum to the entire nanosphere. By measuring the nanosphere's recoil momentum for each decay, the momentum of the emitted antineutrino can be determined. In this poster, I detail construction efforts of a microfluidic system designed to release microdroplets containing nanospheres into a custom radiofrequency Paul trap. This will enable controlled transportation of single radioactive nanospheres from the Paul trap into the optomechanical sensor without introducing background radiation in our experiment.

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