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A TPC with optical readout for directional detection of dark matter HIDEFUMI TOMITA, STEVE AHLEN, Boston University, DENIS DUJMIC, PETER FISHER, ASHER KABOTH, JOCELYN MONROE, GABRIELLA SCIOLLA, MIT, HERMANN F. WELLENSTEIN, Brandeis, RICHARD YAMAMOTO, MIT, BU-MIT-BRANDEIS DARK MATTER GROUP TEAM — A TPC with optical readout has been developed with the goal of detecting the sense and direction of the elastic recoils generated by Dark Matter interactions. The detector, filled with CF₄ gas at low pressure, was placed in a low-energy neutron beam and used to record the scintillation light created by the recoiling gas nuclei. The variation of the light intensity observed along the track is due to the decreasing ionization rate. This effect, known as the “head-tail” effect, allows us to determine the direction of the incoming neutrons.

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