

The Scattering of Slow Neutrons by Liquid Ortho- and Parahydrogen

We have measured the scattering of slow neutrons (90°K) by liquid hydrogen varying in *ortho* and *para* content, and have found that orthohydrogen scatters decidedly more than parahydrogen, as predicted by the theory.¹

The slow neutrons were produced by a 200 mg (Ra-Be source and were cooled down with liquid methane. A beam of these neutrons was allowed to pass through a quartz Dewar vessel (3 cm diameter, 1 cm thickness) filled with liquid hydrogen, and was detected by the radioactivity induced in rhodium sheets. Measurements with and without cadmium absorbers allowed the detection of the slow neutrons. The ratios of the activities with the vessel filled with water, with 61 percent orthohydrogen, and with 46

percent orthohydrogen, to the activity with the vessel empty were 0.07, 0.3, and 0.5, respectively. With the use of these data, a rough calculation shows that the mean free path of the neutrons in orthohydrogen is about the same as in water (taking into account the proton densities), but much larger in parahydrogen.

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¹E. Teller, Phys. Rev. **49**, 420 (1936); Julian Schwinger and E. Teller, Phys. Rev. **51**, 775 (1937).