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Search for long-range forces of a neutron and atoms with a trap of ultracold neutrons

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A method of using a gravitational UCN spectrometer to search for long-range forces between neutrons and atoms is proposed. The constraints on the strength of long range forces within the range of 10^{-10} - 10^{-4} cm were obtained from the experiments on measurements of the total cross section of interaction of UCN with atoms of the noble gases and the data on the coherent neutron scattering length of the nucleus. Further prospects of UCN method is discussed.

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