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BRAND: Search for BSM physics at TeV scale by exploring the transverse polarization of electrons emitted in neutron decay

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Neutron and nuclear beta decay correlation coefficients are sensitive to the exotic scalar and tensor interactions that are not included in the Standard Model (SM). The BRAND experiment will measure simultaneously 11 neutron correlation coefficients ($a, A, B, D, H, L, N, R, S, U, V$) where 7 of them (H, L, N, R, S, U, V) depend on the transverse electron polarization – a quantity which vanishes in the SM. The neutron decay correlation coefficients H, L, S, U, V were never attempted experimentally before. The expected impact of the proposed experiment that currently takes off on the cold neutron beamline PF1B at the Institut Laue-Langevin, Grenoble, France, is comparable to that of the beta spectrum shape measurements [1] but offers completely different systematics and additional sensitivity to imaginary parts of the scalar and tensor couplings. In the poster, challenges of the proposed techniques will be presented together with a setup designed for testing them in the real environment at ILL.

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[1] L. De Keukeleere et al. –poster in this conference.

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