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The new magnetic field optimisation procedure of the nEDM experiment at PSI

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The neutron Electric Dipole Moment experiment at the Paul Scherrer Institute is currently the most sensitive in the world.

One of the main improvements that made this possible is the new algorithm that was developed to optimise the magnetic field.

Using a combination of both offline magnetic field maps and online monitoring with an array of Cs magnetometers, the currents applied to a set of 30 coils are tuned such that the longitudinal homogeneity of the field is prioritised over the transversal homogeneity, while at the same time keeping systematic effects related to transversal components under control.

The magnetic field configurations thus obtained result in a Ramsey contrast (visibility) of typically 0.75 to 0.8, whereas previously the experiment was ran at a visibility of 0.55 to 0.60. As such, the sensitivity of our experiment is effectively increased by 30%.

Author: Ms WURSTEN, Elise (KU Leuven)

Presenter: Ms WURSTEN, Elise (KU Leuven)

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