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Data blinding for the nEDM experiment

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Psychological bias towards (or away from) a prior measurement or a theory prediction is an intrinsic threat to any data analysis. While various methods can be used to avoid the bias (e.g. actively not looking at the result), only data blinding is a traceable and thus trustworthy method to circumvent the bias and to convince the external audience that there is not even an accidental psychological bias.

Data blinding is nowadays standard in particle physics, but it turns out that it is particularly difficult for a neutron electric dipole moment experiment as several cross measurements (various magnetometers) create a self-consistent network where it is hard to inject a fake signal.

In this presentation I will describe those difficulties and how they were defeated by our collaboration. This includes the mathematical models, as well as the cryptographic tools that ensure a trustworthy blinding. The practical implications on the day-to-day measurements will be explained, as well as strategies for unblinding the data. I will conclude with a compatibility check for future experiments.

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