

2D laser cooling a focused beam of BaF molecules

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The NL-*e*EDM collaboration uses a beam of BaF molecules to conduct a precision measurement of the CP-violating electron electric dipole moment (*e*EDM) [1]. By combining a cryogenic buffer gas beam [2], an electrostatic hexapole lens [3] and 2D transverse laser cooling applied near the focus of the lens, a narrow and collimated beam of $> 10^6$ BaF molecules per second can be produced.

We report on recent results demonstrating and analyzing 2D transverse laser cooling of the BaF beam. Trajectory simulations are matched to the experiment and used to project the attainable improvement in *e*EDM sensitivity compared to the previous iteration of the NL-*e*EDM experiment. In the near future, we will combine the intense, focused and laser cooled cryogenic beam with the existing NL-*e*EDM experiment.

References

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