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Nuclear magnetic moments of francium 207-213 from precision hyperfine comparisons JACINDA GINGES, BENJAMIN ROBERTS, The University of Queensland — We report a fourfold improvement in the determination of nuclear magnetic moments for neutron-deficient isotopes of francium 207-213, reducing the uncertainties from 2% for most isotopes to 0.5%. These are found by comparing our high-precision calculations of hyperfine structure constants for the ground states with experimental values. In particular, we show the importance of a careful modeling of the Bohr-Weisskopf effect, which arises due to the finite nuclear magnetization distribution. This effect is particularly large in Fr and until now has not been modeled with sufficiently high accuracy. An improved understanding of the nuclear magnetic moments and Bohr-Weisskopf effect are crucial for benchmarking the atomic theory required in precision tests of the standard model, in particular atomic parity violation studies, that are underway in francium. B. M. Roberts and J. S. M. Ginges, arXiv:2001.01907 (2020).

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