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Magneto-photoluminescence in lanthanide-bearing endohedral metallofullerenes with various cage symmetries[1] TRAVIS MERRITT, HARRY DORN, GITI A. KHODAPARAST, Virginia Tech, STEVE MCGILL, National High Magnetic Field Laboratory — Taken as a family, endohedral metallofullerenes (EMF) nanomaterials provide opportunities for exquisite functional tunability at the nanoscale, enabling a wide range of synthetic nanoparticles with diverse sizes, symmetries, electronic, optical and, especially, magnetic properties. In particular, metallofullerenes incarcerating lanthanide ions will permit endohedral luminescence due to the 4f optically-active electrons being uninvolved in the stabilizing charge transfer between the endohedral guest and cage. In addition, if those lanthanide ions possess optical transitions beyond the absorption onset of the cage, a well-defined optical spectrum may be observed for the metallofullerene system. In this talk, several magneto-optical and time-resolved studies at high magnetic fields on lanthanide-based EMFs with different cage symmetries will be presented, where the residual magnetic degeneracies in the lanthanide ion energy levels are lifted and observed in the optical spectrum with magnetic field strengths in excess of 10 T.

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