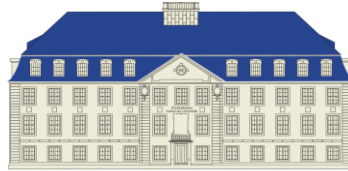




Institut für  
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## COLLOQUIUM „OPTICS AND CONDENSED MATTER“

***Kurt Gibble***

*Pennsylvania State University, USA*

### **Laser-cooling Cadmium with only UVA Triplet Excitations and Cd Isotope Shifts**

Cadmium has attractive properties for optical lattice clocks, ultracold atomic gases, and searches for Dark Matter and beyond-Standard-Model physics via isotope shift measurements. In addition to some of our broader work on atomic clocks, including microwave fountain clocks that keep International Atomic Time, I will describe our recent work to laser-cool cadmium. Cadmium is an alkaline-earth like atom with two valence electrons, with a broad UVC singlet resonance line at 229 nm and a narrow 67 kHz wide UVA intercombination line at 326 nm. Without using 229 nm light, we trap  $\sim 10^7$  atoms using only the intercombination line and UVA excitations to higher triplet states with sum-frequency generated laser light. Cadmium's 8 stable isotopes, 6 spin 0 bosonic isotopes, in addition to 2 spin  $\frac{1}{2}$  fermionic isotopes, along with its moderate nuclear mass, make its isotope shifts attractive for tests of fundamental physics. I will also discuss our measurements of isotope shifts of three cadmium transitions and their sensitivity as probes of beyond standard model physics.

**October 24th, starting with discussion at 17:00 h, talk at 17:15 h, live IAP lecture hall or via Zoom**

<https://uni-bonn.zoom.us/j/98441612025?pwd=a01SSjlkY1Q3SDFhL09JQk1qc1V6dz09>

Meeting-ID: 984 4161 2025

Kenncode: 294164