



EINLADUNG

zum

VERA - SEMINAR

von

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**Towards laser cooling of negative ions**

Currently available cooling techniques for negatively charged particles allow cooling only to the temperature of the surrounding cryogenic environment, typically at 4 K if the apparatus itself is cooled with liquid helium. At these temperatures, the precision of spectroscopic measurements is often limited by inhomogeneous broadening due to thermal motion. Laser excitation of a fast electronic transition in an atomic anion could be used to laser-cool an ensemble to microkelvin temperatures. If demonstrated to be successful, the technique would allow the cooling of any species of negatively charged particles - from subatomic particles to molecular ions - to ultracold temperatures by sympathetic cooling.

Atomic anions are generally not amenable to optical spectroscopy or laser cooling because they are loosely bound systems and rarely have bound excited states. Until now, there are only very few negative ions with strong electronic transitions. We have been investigating the bound-bound electric-dipole transition in  $\text{Os}^-$  by high-resolution laser spectroscopy to ascertain its suitability for laser cooling. The study of these transitions also provides unique insight into the structure of atomic anions. The principle of the method, its potential applications, as well as experimental results will be presented.

**Donnerstag, 16. Mai 2013, 16:30 Uhr**

**1090 Wien, Währinger Str. 17, "Kavalierstrakt",  
1. Stock, Victor-Franz-Hess Hörsaal**