universität innsbruck

Institut für Ionenphysik
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Institutsseminar

Metal nanoparticles as size-resolved probes of quantum materials and phenomena

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Nanoparticles offer a powerful platform for probing fundamental questions in surface science. In particular, the nanoparticle ionization energy (IE)—analogous to the work function (WF) in bulk materials—is a fundamental property that reflects not only the electronic spectrum but also the structural dynamics. We use high-precision, size- and isotope-resolved photoionization of alkali metal nanoparticles to study the temperature dependence of IE (IE(T)). Our data reveals an abrupt shift in IE(T) associated with the melting transition, which occurs at a temperature far below the bulk melting point. Finally, isotope-resolved data reveal a variation between Li-6 and Li-7, highlighting quantum and lattice dynamics beyond simple models.

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