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Investigating mechanisms of state (de)localisation in highly ionized, dense plasmas THOMAS GAWNE, PATRICK HOLLEBON[1], GABRIEL PEREZ-CALLEJO, OLIVER HUMPHRIES, JUSTIN WARK, SAM VINKO, University of Oxford — Recent experiments investigating dense plasmas have shown significant discrepancies with continuum lowering predictions from standard plasma models. Much of the theoretical difficulties encountered in plasmas where Debye lengths are comparable to inter-particle spacings can be traced back to the difficulty of defining valence states as either purely bound, or purely free. Here we describe an approach to resolve this difficulty using finite-temperature density functional theory. By looking at the inverse participation ratio for valence states in highly ionized plasmas we propose a method to measure the "boundness" of a state in terms of its spatial localization. We apply this technique to help interpret spectroscopic experimental measurements of continuum lowering conducted at the LCLS free-electron laser at SLAC.

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