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Measurement of the mobility edge for 3D Anderson localization GIULIA SEMEGHINI, MANUELE LANDINI, PATRICIA CASTILHO, SANJUKTA ROY, GIACOMO SPAGNOLLI, ANDREAS TRENKWALDER, MARCO FATTORI, LENS - University of Florence and INO-CNR, MASSIMO INGUSCIO, INRIM Istituto Nazionale di Ricerca Metrologica, GIOVANNI MODUGNO, LENS - University of Florence and INO-CNR — An outstanding problem of Anderson localization (AL) in 3D systems is the determination of the mobility edge, i.e. the energy threshold that separates localized and extended states. In our experiment we use a Bose-Einstein condensate of ^{39}K atoms and study its transport properties in a disordered optical potential. By tuning the inter-particle interactions to zero via magnetic Feshbach resonances, we study the single-particle phenomenon of AL. A novel technique to measure and control the atomic energy distribution allows us to measure for the first time the position of the localization threshold as a function of the disorder strength [G. Semeghini et al., *Nature Physics* **11**, 554-559 (2015)]. We also study how the addition of finite repulsive or attractive interactions breaks the localized regime and triggers subdiffusive expansion of the atoms. In the future, similar experiments might also probe the existence of many-body localization in 3D.

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