

Interaction of Cold Metastable Neon Atoms

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The understanding of the interaction of cold atoms will be substantially extended by the study of cold non-alkaline systems. Due to the special internal structure and the high internal energy, metastable noble gases will play a key role. With our work, we want to provide for a detailed study of the interactions in a gas of cold metastable neon atoms by creating ensembles of high phase space density. If possible, we want to obtain Bose Einstein condensation of metastable neon. Therefore, the lifetime of the metastable state and the rates of elastic collisions as well as the two and three body loss processes have to be determined experimentally. Of special interest is Penning ionisation, being the main loss process in dense metastable atom samples. The degree of its suppression in a spin polarized gas strongly affects the feasibility of reaching the quantum degenerate regime. We report on lifetime measurements of the metastable state, the rate of Penning ionisation in a MOT and properties of an ensemble in a magnetic trap. This work is supported by the Deutsche Forschungsgemeinschaft within the focused research program 'Wechselwirkungen von kalten Atomen und Molekülen'.