

With a so-called Stark decelerator, a part of a molecular beam of neutral polar molecules can be selected and transferred to any arbitrary velocity, producing bunches of state-selected molecules with a computer-controlled velocity. This new technology has been used to confine molecules in traps for several seconds, enabling direct measurements of the lifetimes of long-lived excited states. It has also been used in crossed beam scattering experiments to vary the collision energy with an unprecedented energy resolution.