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Double BEC of Rb and Sr: the power of sympathetic narrow-line cooling BENJAMIN PASQUIOU, ALEX BAYERLE, SIMON STELLMER, SLAVA TZANOVA, RUDOLF GRIMM, FLORIAN SCHRECK, Institut fuer Quantenoptik und Quanteninformation, Oesterreichische Akademie der Wissenschaften — We report on the creation of a rubidium/strontium double BEC. A striking aspect of our method is the efficient cooling of rubidium by strontium atoms, which are laser cooled on a narrow intercombination line. This powerful technique allows us to cool the mixture to 1 microkelvin, reaching a phase-space density of 0.07 for Sr and 0.015 for Rb in an optical trap. Evaporative cooling from such favorable starting conditions leads to simultaneous Bose-Einstein condensation of both species, with 1.5×10^5 atoms in each cloud. The sympathetic narrow-line cooling could be very helpful to bring other species and mixtures to quantum degeneracy. Double BEC of Rb and Sr is the first step on our path to produce open-shell polar molecules. Contrary to bi-alkali molecules studied so far, alkali/alkaline-earth RbSr molecules will exhibit both an electric and magnetic dipole moment. This additional internal degree of freedom will give us more flexibility to control RbSr molecules, and will be helpful for the simulation of spin dependent lattice models.

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