# Laser cooling AlF molecules in the deep ultraviolet

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We report recent progress toward the production of a Bose-Einstein condensate of stable, deeply bound, and polar AlF molecules. AlF exhibits several advantageous properties compared to previously cooled molecular species. It is deeply bound, chemical reactions between AlF molecules are endothermic, and the formation of long-lived collisional complexes is highly suppressed. These features make AlF a promising candidate for direct evaporative cooling without the need for collisional shielding.

In addition, AlF offers an alkaline-earth-like level structure: it features a strong cycling transition in the deep ultraviolet, enabling rapid loading of a large magneto-optical trap. Moreover, AlF possesses weak, spin-forbidden transitions that are suitable for narrow-line cooling, trap accumulation, and precision metrology.