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A new source for quantum optics with biomolecules and biomolecular clusters MARKUS MARKSTEINER, PHILIPP HASLINGER, HENDRIK ULBRICHT, MARKUS ARNDT, Faculty of Physics, University Vienna — We present recent progress towards matter wave experiments with amino acids, polypeptides and large biomolecular clusters. All successful experiments on macromolecule interferometry so far, with fullerenes, fullerene derivates and large perfluoroalkyl-functionalized azobenzenes used effusive beam sources. The combination of Stark deflectometry with quantum interferometry also allowed us to create a new device for precisely measuring electric susceptibilities of large molecules in the gas phase. In order to apply quantum interference to molecules of biological interest, we have now implemented a pulsed laser desorption source. The combination of UV laser desorption into an intense noble gas jet and single-photon ionization by a VUV excimer laser (157nm) allows us to observe intense neutral jets of amino acids (e.g. Tryptophan), nucleotides (e.g. Guanin) and polypeptides ranging from tri-peptides to Gramicidin. Remarkably, we also found a new method for producing large neutral amino acid clusters, such as for instance Trp_{30}, with masses exceeding 6000 amu: the addition of alkaline Earth salts in the desorption process leads to the inclusion of at least one metal atom per complex and is sufficient to catalyze the cluster formation process.

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