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Production of meson molecules in ultra-peripheral heavy ion collisions

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In this work we present a calculation of exotic charmonium production in ultra-peripheral collisions, in which the exotic state is explicitly treated as a meson molecule. Our formalism is general but we focus on the lightest possible exotic charmonium state: a D^+D^- molecular bound state. It was proposed some time ago and it has been the object of experimental searches. Here we study the production of the open charm pair in the process $\gamma\gamma \to D^+D^-$. Then we use a prescription to project the free pair $|D^+D^-\rangle$ onto a bound state at the amplitude level and compute the cross section of the process $\gamma \to B$ (where B is the bound state). Finally, we convolute this last cross section with the equivalent photon distributions coming from the projectile and target in an ultra-peripheral collision and find the $AA \to AAB$ cross section, which, for $PbPb$ collisions at $\sqrt{s} = 5.02$ TeV, is of the order of 3 μb.

Author: CÉSAR SILVA SANTOS SOBRINHO, Fernando (Universidade de São Paulo)

Presenter: CÉSAR SILVA SANTOS SOBRINHO, Fernando (Universidade de São Paulo)