P21 | **A two-particle model for Positronium confined in sub-nanometric cavities**

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In the last years, the electron-positron bound state, namely the positronium atom (Ps), has been widely used as a probe to test structural properties of porous materials. This is possible thanks to the strong connection between Ps annihilation rate and the electronic structure of the confining medium.

Accessible experimental measurements concern annihilation rates by pickoff processes and contact densities (the electron density at the positron position).

While the pickoff process is well understood, existing models describing Ps properties in nanometric or sub-nanometric cavities fail to justify the lowering of the contact density with respect to that of Ps in vacuum, as found in most materials.

For this reason we formulated a new two-particle model in which only the electron is confined in the cavity [1], while the positron is moving freely and feels the medium via a positive work function. We show that this model explains experimental data for a large class of materials and suggests a way to gain information on pore sizes and positron work functions.

[1] G. Marlotti Tanzi, F. Castelli, and G. Consolati, *Phys. Rev. Lett.* 116, 033401 (2016)