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Solution of the four-body Coulomb problem by the modified Faddeev-Yakubovsky equations

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Inspired by the Faddeev-Merkuriev approach [1] we have modified the four-body Faddeev-Yakubovsky [2] equations, writing them in a form suitable to solve the four-body Coulomb problem. The newly developed formalism has been applied to study bound and some resonant states in $(Ps)_2$ and $\overline{H}$-Ps compounds. The first successful attempt to describe low energy Ps-Ps and $\overline{H}$-Ps scattering has been also realized. The aforementioned systems represent great interest for the experiments with antimatter (like AEGIS, ALPHA or GBAR) carried out at CERN .

[1] S. P. Merkuriev Ann. Phys. (N.Y.), vol. 130, p. 395, Jun 1980.
[2] O. A. Yakubovsky, Sov. J. Nucl. Phys. 5, 937 (1967).

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