Abstract Submitted
for the CAL09 Meeting of
The American Physical Society

Exact treatment of confinement in the semirelativistic Faddeev approach to three-quark problems JOSEPH DAY, JOSEPH MCEWEN, ARNULFO GONZALEZ, ZOLTAN PAPP, California State University Long Beach, WILLIAM PLESSAS, University of Graz — The spin=1/2 elementary particles, the baryons, are mostly described as three-quark configurations. The quarks obey relativistic quantum mechanics. Their mutual interaction is modeled by infinitely rising potentials whose short-range nature is mediated by the exchange of Goldstone bosons. We solve the relativistic three-quark problem by using the Faddeev method. In the Faddeev method we break the wave function into components, and the components satisfies somewhat better integral equations. Nevertheless, the solution was not possible without approximating and violating the asymptotically rising potential. In this work we overcome this problem. We devised an approximation method, which allows the exact calculation of the Green's operator of an asymptotically rising potential with semirelativistic kinetic energy operator by using matrix continued fractions.

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Date submitted: 19 Oct 2009 Electronic form version 1.4