

## Paralelas PA07

# Exact Foldy-Wouthuysen transformation for a Dirac equation describing the interaction of spin-1/2 relativistic particles with an external electromagnetic field

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### **Abstract:**

The Thomas-Bargmann-Michel-Telegdi (T-BMT) equation is derived using the Exact Foldy-Wouthuysen transformation. Extra new terms were found, and we discuss their possible physical applications. The main point of this work is to detail the procedure to get the general result. We explicitly present the choice of parametrization we used on the initial Hamiltonian and the motivations to take it. We emphasize that the final equations can depend on this choice, and it is possible to prevent the manipulations of the quadratic Hamiltonian become extremely cumbersome. More importantly, it is done in such a way that the transformed equations allow the direct separation into mass, kinetic, and interaction correction terms to the original T-BMT equation.

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