

Worldline geometry probed by spinning particle

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Interaction of spin with electromagnetic field yields an effective metric along the world line of spinning particle with anomalous magnetic moment. If we insist to preserve the usual special-relativity definitions of time and distance, critical speed which the particle can not overcome during its evolution in electromagnetic field differs from the speed of light. Instead, we can follow the general-relativity prescription to define time and distance. With these definitions, critical speed coincides with the speed of light. But intervals of time and distance probed by the particle in the presence of electromagnetic field slightly differ from those in empty space. Effective metric arises also when spin interacts with gravitational field.