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Sungrazing comets as General Relativistic gravitational probes

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The sungrazing comets are a class of comets whose number significantly increased in the last 26 years, since the SOHO coronographes entered in function, at the rithm of about hundred per year.
A review in the gravitational studies on such comets, starting from Newton is presented.
Their orbital parameters suggest their grouping as related to a few parent bodies, and the pionieristic statistical work of Fermi made in 1922 at the Normal School of Pisa for the comets is recalled.
The sungrazing comets are the celestial bodies which approach more closely the mass of the Sun, the larger of the solar system: then their orbital parameters are influenced by both General Relativity and non gravitational effects, like mass loss and outgassing.
The comparison between the General Relativity effects and the non gravitational effects is made to understand the observational accuracy required on Mercury's perihelion in the second part of XIX century, in the studies carried by Le Verrier and Newcomb, with objects that may graze the solar surface. The accuracy on the determination of the orbital parameters of sungrazing comets is also investigated, to enforce with observations all these theoretical concepts.
The identification of new sungrazing comets is possible online, at the SOHO website, and it has been realized with the high school students of Galileo Ferraris Institute, Rome, as curricular activity, with great enthousiasm, especially for the nearly real time discoveries.

References

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