## Nuclei in the Cosmos - IX



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## Enhanced electron screening in nuclear reactions and radioactive decays

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In recent years, an enhanced electron screening in metallic environments has been demonstrated by many groups in experimental investigations of low-energy nuclear reactions. Similarly, first radioactive decay experiments in metallic materials have been performed to possibly observe an alteration of the decay constant due to electron screening. Both kinds of experiments are of fundamental importance for nuclear astrophysics since the metallic quasi-free electrons represent a model for dense astrophysical plasmas and thus the corresponding theories can be experimentally verified. Here, the self-consistent dielectric function theory will be applied to determine electron screening energies in different metallic materials. The results will be compared with the experimental values obtained for different nuclear reactions and some predictions for radioactive decay experiments will be presented. Furthermore, several solid state effects which can lead to an increase of the screening energy will be discussed. Special interest will be devoted to the temperature dependence of the electron screening effect.

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