

Abstract Submitted  
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**Electron screening in  $d(d,p)t$  for deuterated metals: temperature dependence**<sup>1</sup> FRANCESCO RAIOLA, Ruhr Universitaet Bochum, LUNA COLLABORATION — The electron screening effect in the  $d(d,p)t$  reaction has been studied at the Ruhr-Universität Bochum for most of the metals and some insulators/semiconductors by using deuterated targets [1]. The deuterated targets were produced via implantation of low-energy deuterons. As compared to measurements performed with a gaseous  $D_2$  target, a large effect has been observed for all metals. In particular work has been done to investigate the high solubility for the metals of groups 3 and 4 and the lanthanides, at a sample temperature  $T = 200^\circ\text{C}$ . The hydrogen solubility in the samples dropped to a level of few percent (compared to  $T = 20^\circ\text{C}$ ) and a large screening became thus observable. An explanation of the large effect in metals is provided by the plasma model of Debye applied to the quasi-free metallic electrons. A first evidence of the validity of Debye's model is that the deduced number of free electrons per metallic atom agrees with the calculated number from the Hall coefficient [2], for all metals investigated. A critical test of the classical Debye model is the temperature dependence  $U_e \propto T^{-1/2}$ .

[1]F.Raiola et al.: Eur. Phys. J.A19(2004)283;

[2]C.M.Hurd: "The Hall effect in metals and alloys"; (Plenum Press, 1972).

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