Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Pauli blocking in low-dimensional Fermi systems at finite temperatures[1] FRANCISCO J. SEVILLA, Instituto de Fisica UNAM, M. FORTES, Instituto de Fisica, UNAM, M.A. SOLIS, Instituto de Fisica UNAM — The chemical potential of an ideal Fermi gas for dimensions $d < 2$ increases with temperature up to a maximum value [1], in sharp contrast with the monotonic decreasing behavior in the $d = 3$ case [2]. The origin of this anomaly is examined in systems of non interacting fermions described by a more general energy-momentum dispersion relation $\epsilon \propto k^s$. We show that the abnormal behavior is caused by the interplay of the density of states as a function of d/s and the exclusion principle producing a Pauli-blocking effect at finite temperatures. In the one-dimensional ideal Fermi gas, the effect is manifest up to temperatures as large as the Fermi temperature.

[1] M. Grether, M. de Llano, and M.A. Solís, Eur. Phys. J. D 25, 287 (2003).
[2] G. Cook and R.H. Dickerson, Am. J. Phys. 63 (8), 737 (1995).

[1]We acknowledge the partial support from grants PAPIIT IN114708 and CONACyT 0104917

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Date submitted: 10 Dec 2009 Electronic form version 1.4