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Dimensional crossover of a fermion gas within periodic structures PATRICIA SALAS, M.A. SOLIS, Instituto de Fisica, UNAM — We report the thermodynamic properties of an interactionless Fermi gas immersed in periodic structures such as penetrable multilayers or multitubes created by one (planes) or two perpendicular (tubes) external Dirac comb potentials, allowing fermions to move freely in the remaining directions. The chemical potential μ, as a function of temperature and of the planes impenetrability P_0, shows a anomalous behavior when the tubes wall impenetrability reaches a critical value while keeping the cross section constant. The specific heat of fermions inside tubes, as a function of temperature, shows two very noticeable dimensional crossovers as the system behavior goes from 3D to 2D and latter to 1D as P_0 is increased.

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