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Coulomb heating behavior of fast light diclusters channeled into Si (110) direction

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In this presentation, we show data on the Coulomb heating induced by H, B, and C molecular beams channeling along the Si<110> direction. The simultaneous detection of Si K alpha X rays and the corresponding backscattered particles and molecules established the grounds of the determination of the corresponding Coulomb heating. That is the molecular transversal energy due to the Coulomb explosion transferred to the target atoms. The energies used for each ion were for H at 150 keV/atom, for B, it spans a large energy interval between 800 and 2200 keV/atom and finally for C, between 800 and 2400 keV/atom. As a consequence, we have obtained two striking results. First, all the experimental values fall on a straight line when they are plotted as a function of the stored energy per atom, suggesting some kind of "universal behavior". Second, the analysis of the whole set of experimental data shows that the Coulomb heating scales with 2/3 of the stored potential energy per ion regardless the ion atomic number. The corresponding experimental values are in good agreement when compared with the theory developed for the present case. Finally, we compared the present results with the ones obtained in the Si <100> direction, which were obtained under similar experimental and theoretical conditions. It has shown striking differences between both cases based on the mean charge state obtained in each experiment.

Biography

Moni Behar completed his PhD at the University of Buenos Aires and his Post-doc at the Purdue University (in) USA. He is an Emeritus Professor of the Universidade Federal do Rio Grande do Sul and a full Professor of the Department of Physics. He has published more than 300 papers in reputed journal and has been Member of the Editorial Board of several journals.

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