Size dependence of the optical and thermal properties of sodium clusters^(*)

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The transition from the atom, molecule, over the cluster, to the solid can be very well studied for sodium. Only for two cases does the optical response show broad plasmon-like peaks which are well described by the “Nearly Free Electron” or jellium model: a) for clusters with more than about 20 atoms, and b) for small ($7 \leq n \leq 20$) liquid clusters. Only for these two cases is a comparison to the nuclear physics case meaningful.

Sharp “molecular-like” peaks are observed for small, cold sodium clusters. The slow transition between these only seemingly different results was shown, and it was discussed how the cluster temperature influences this transition [1, 2].

Three other topics were briefly mentioned: 1) first measurements of the melting point and latent heat of fusion of free, size selected clusters, 2) the multiple plasmon excitation of a size selected cluster with an intense femto-second laser pulse, and 3) a technological application of clusters to thin film formation [3].

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