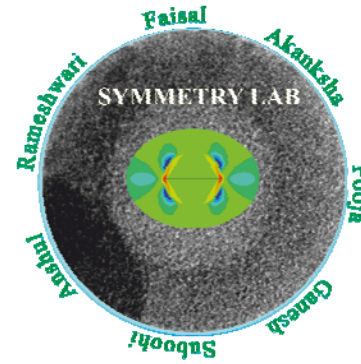


Snapshots



From

Symmetry Lab



Symmetry Lab with festive lights



Lab at a Glance





Suboohi Shervani_IMMT_best oral presentation prize_IMMT_2014

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Liquid like nucleation in free-standing nanoscale films†

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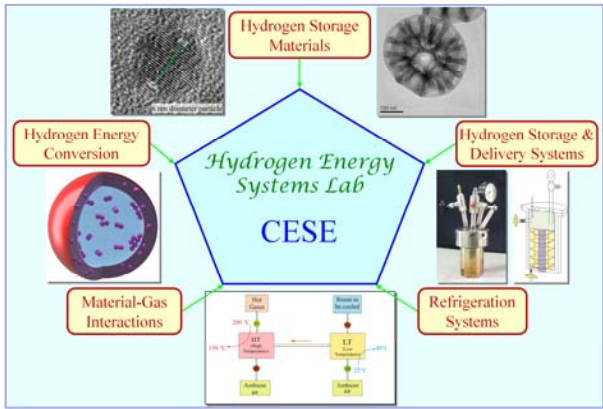
Pooja Rani Scales 'nano' heights!

The concept of a critical nucleus size (r^*) is of pivotal importance in phase transformations involving nucleation and growth. The current investigation pertains to crystallization in nanoscale thin films and study of the same using high resolution lattice fringe imaging (HRLE) and finite element simulations. Using the CuZnAl bulk metallic glass system as a model system for this study, we demonstrate a liquid like nucleation behaviour in nanoscale free-standing films upon heating. The r^* for the formation of the Cu₂Zn phase in thin films (of decreasing thickness) approaches that of the r^* for the formation of the crystal from a liquid $2k_B \frac{\gamma_{sl}}{\Delta G_v} - \frac{4\pi r^3 \Delta G_v}{3}$. Working in the nucleation dominant regime, we introduce the concept of 'depth sensitive lattice fringe imaging'. The thickness of the film is determined by electron energy loss spectroscopy and the strain energy of the system is computed using finite element computations.

HRLE from a crystallite ($\phi = 2.86$ nm) embedded in an amorphous matrix. EELS spectrum which is used in the computation of the thickness of the specimen, concept of 'depth sensitive lattice fringe imaging' is shown by the schematic and stress state (plot of σ_{xx} contours) in the presence of a crystal of radius 1 nm, located at a distance of 2 nm from the surface ($h = 2$ nm) in a 4 nm thick film.









Treat at Pizza Hut (July 2012)



Treat at Dominos (June 2010)



At Birla Temple Kanpur (June 2010)



One of the two in the photo is Anil Shukla

