

# Microgravity research programme – Announcement of opportunities

THIS announcement solicits microgravity research proposals (experiments/studies) in the area of materials science/processing, fluid physics/dynamics and biology/biotechnology. Participation in this programme is open to all research/educational institutions and other non-profit organizations. Proposals may be submitted at any time to the Programme Director, Space Science Office, ISRO HQ, New BEL Road, Bangalore 560 094. The proposal should contain the following information:

Title of the proposal, principal investigator, institution and address, co-investigators, abstract of the proposal, overall scientific objectives and justification of the work, previous work of investigation in related areas, plan of work, methods and techniques used, recent publications (not more than five) relevant to the proposed work, budget summary (fellowships, equipment, consum-

ables/components, travel and contingencies) and time schedule.

The proposers are requested to note that ISRO has taken up the task of formulating and supporting a national level programme on microgravity research, first by conducting innovative and novel experiments utilizing existing laboratory facilities, the national balloon facility (for balloon drop experiments which could provide microgravity level of  $10^{-3} g$  for about 60 s) from Hyderabad as well as those planned like the recoverable rocket payload and satellite capsules. In the first phase, priority will be given to ground experiments and exploratory studies which can provide valuable experience and set the necessary background for the balloon, rocket and space-borne experiments. These proposals will be assessed based on their originality, novelty and feasibility.

Applicants might wish to consider the following areas (but are welcome to think of others):

## 1. Material processing in space

Dendrite Growth; Eutectic Growth; Nucleation in undercooled melts; Formation of inter-metallic compounds like InSb-AlSb; Formation of homogeneously dispersed microstructure in miscibility gap system; Formation of composites by introduction of solid dispersoids; Thermophysical property measurement of under cooled melts; Wetting phenomenon in space; Polymerization reaction in space; Dissolution and mixing of second phase under microgravity conditions; Crystal growth; Orbital processing of eutectics; Bubble movement in confined liquids; Joining and welding in microgravity conditions.

## 2. Fluid dynamics/physics

Computational Fluid Dynamics (CFD) and simulation techniques for microgravity-related phenomena; Surface instabilities, solidification, coagulation, etc.; Multiphase flows including two-phase systems; Bubbles and convection phenomena; Colloidal crystal growth under microgravity; Complex fluids; Marangoni convection; Effects of fluid flow on crystal growth; Smouldering combustion – upward and downward; Bubble collapse.

## 3. Space biology and biotechnology

Zero-*g* as a stressful environment *vis-à-vis* genetics, development, physiology and behaviour; plant and crystal growth under microgravity and gravitropism-related phenomena in general; Experiments having bearing on the origins and evolution of life.