Observation and Analysis of Smectic Islands in Space (OASIS)

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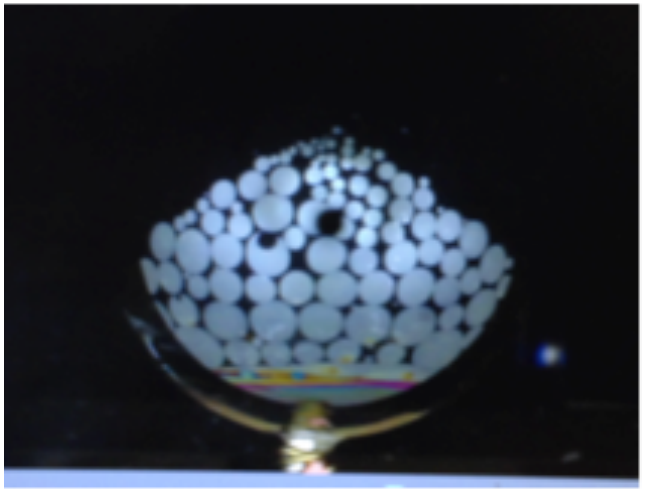

Image of bubble with smectic islands.

Objective:

- To exploit the unique characteristics of freely suspended liquid crystals in a microgravity environment to advance the understanding of fluid state physics.
- Will specifically study basic 2D hydrodynamics/fluid physics, probe droplet/island diffusion, hydrodynamic interactions, and droplet/island coalescence.

Relevance/Impact:

- Basic application for ferroelectric liquid crystal micro-displays and very high speed electro-optic devices. The process of making flawless and very fast rate data updating projection display could best be achieved by detail studying of annealing dislocations systematically only achievable in microgravity.
- The proposed liquid crystal bubble experiments resolve the annealing dislocation problem of smectic ferroelectric liquid crystal micro-displays, one of the key aspects of generating well aligned electro-optic devices.

Development Approach:

- Designed to interface and operate within the MSG.
- OASIS will consist of 4 modules that will support freely suspended bubble film formation, picoliter droplet injection, external E field perturbation and dynamic oscillation of the bubble.

ISS Resource Requirements

Accommodation (carrier)	Microgravity Science Glovebox (MSG)
Upmass (kg) (w/o packing factor)	57.7 Kg
Volume (m^3) (w/o packing factor)	0.07
Power (kw) (peak)	0.675kw for OASIS / MSG
Crew Time (hrs) (installation/operations)	5 Hours
Autonomous Operation	2 months
Launch/Increment	SpaceX-6/ Inc 40-41

Project Life Cycle Schedule

Milestones	SCR	RDR	PDR	CDR	PIII FSR	PSR	FHA	Launch	Ops complete	Final Report
OASIS	5/2008	4/11	3/12	5/13	5/14	6/14	6/14	9/14	4/15	4/16