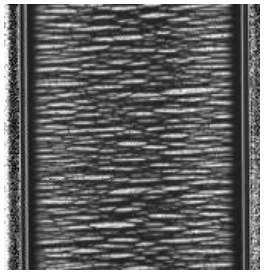
ZIN Technologies

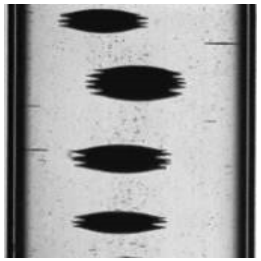
Investigating the Structure of Paramagnetic Aggregates from Colloidal Emulsionsment (InSPACE)

InSPACE Set up in the Microgravity Science Glovebox (MSG) onISS



MR fluids in a continuous magnetic field on orbit develops a cross-linked network structure.

MR fluid in a pulsed field on orbit undergoes a novel structural alignment.



Objective:

- The purpose of this investigation is to obtain fundamental data of the complex properties of an exciting class of smart materials termed magnetorheological (MR) fluids.
- MR fluids are suspensions of small (micron-sized) superparamagnetic particles in a nonmagnetic medium. These controllable fluids can quickly transition into a nearly solidlike state when exposed to a magnetic field and return to their original liquid state when the magnetic field is removed. Their relative stiffness can be controlled by controlling the strength of the magnetic field.
- MR fluids are useful in first aid space safety by providing encapsulation pressure and stints around bone fractures and sprains.
- Due to the rapid-response interface that they provide between mechanical components and electronic controls, MR fluids can be used to improve or develop new brake systems, seat suspensions, robotics, clutches, airplane landing gear, and vibration damping systems.

Hardware Capabilities:

- Provides data on the dynamics and internal particle structure for an assessment of the viscous-elastic properties.
- Precise control of the visco-elastic properties and states enables MR fluid characterization for futuristic robotic interfaces.
- Allows a magnetic field to be applied to a sample (2mm cube).
- Provides orthogonal imaging capability with or without a magnetic field.

Vial Assembly

InSPACE allows a magnetic field to be applied to a sample and provides orthogonal imaging capability