The **Advanced Colloids Experiment (ACE)** is a suite of studies aimed at removing gravitational jamming and sedimentation in colloidal samples so that it is possible to observe how order arises out of disorder and to learn to control this process. Small colloidal particles can be used to model atomic systems and to engineer new systems.

Colloids are big enough (in comparison to atoms) to be seen and consequently slow enough that their evolution can be recorded with a camera. With a confocal microscope and specialty cells, we can observe this process in 3-d and learn to control it.

### Hardware Capabilities:

- **ACE-M**
  - Trans-illumination of samples
  - 15 sample wells
  - Compatible with LMM interfaces
  - Removable/replaceable sample module

- **ACE-H**
  - Bulk heating of samples to 45°C
  - 15 sample wells
  - Compatible with LMM interfaces

- **ACE-T**
  - Provides temperature gradient across samples
  - In-situ mixing of samples
  - 3 sample capillaries
  - Compatible with LMM interfaces
  - Removable/replaceable sample module

### Applications:

- FIR/LMM microscopy studies
  - Colloids
  - Biology

### ISS Resource Requirements

<table>
<thead>
<tr>
<th>Arrival on ISS</th>
<th>April, 2014 (ongoing)</th>
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<tbody>
<tr>
<td>Accommodation (carrier)</td>
<td>Light Microscopy Module (LMM)</td>
</tr>
<tr>
<td>Upmass (kg) (w/o packing factor)</td>
<td>3.5kg/ACE-T base 1.0 kg ACE-M, T module</td>
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<tr>
<td>Volume (m³) (w/o packing factor)</td>
<td>001 m³ ACE T Base .00001 sample module</td>
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<tr>
<td>Power (kw) (peak)</td>
<td>.012kw ACE-T</td>
</tr>
<tr>
<td>Crew Time (hrs) (install/uninstall)</td>
<td>2.5 - 3.5 per installation</td>
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