

## Transport of MAESTRO from downtown to the MMT

Last update: June 7, 2013

- The MMTO staff transports MAESTRO from downtown to the MMT. Coordination with Grant Williams and the mountain staff, especially Ricardo Ortiz, is essential.
- Lower the spectrograph to the cart, instructions are [HERE](#).
- The cart and spectrograph fit in the Steward freight elevator.
- The spectrograph is transported in the MMTO's air-ride truck, usually driven by Tom Oldham.
- The spectrograph and cart are secured with straps in the back of the truck, and there is plenty of space for other equipment.

### Important Notes:

1. **TEMPERATURE Monitoring.** The spectrograph camera/collimator has a large, irreplaceable calcium fluoride lens which is sensitive to mechanical and thermal shock, that is, it can shatter if subjected to steep temperature gradients or fast temperature changes (see e.g. Hilyard Proc. SPIE 4411, Large Lenses and Prisms, 130 (February 7, 2002); doi:10.1117/12.454880). The calcium fluoride lens is protected by a large cell, deep in the spectrograph, which has a large thermal inertia. But it is important to anticipate potential temperature changes during transport.

The ambient temperature, and the temperature of the CaF<sub>2</sub> cell can be monitored with the radio thermometer, attached to a clip board, to log temperatures.

2. **DIRT.** The road to the mountain is dirty. The air-ride truck is enclosed, but the spectrograph should be covered with plastic. Any equipment should be transported inside trucks, or carefully covered with plastic.

3. **STRESS OIL RELIEF VALVE.** The CaF<sub>2</sub> is in a triplet which is oiled. In order that the oil doesn't leak through the cell O-rings and seals, a tube has been attached to the outside of the spectrograph, with a flexible rubber membrane to allow pressure equalization. There is a spigot that allows the oil system to be shut off if the spectrograph is tipped. The

spigot should be OPEN when the spectrograph is transported up the mountain, since the change in atmospheric pressure may cause damage to the cell otherwise. See this page for further instructions.

Pictures: More pictures are located on the MAESTRO web site.

This is the remote temperature monitor. The sensor is taped to the CaFI lens cell. The clip board should be stored in the MAESTRO cabinet when not in use.

