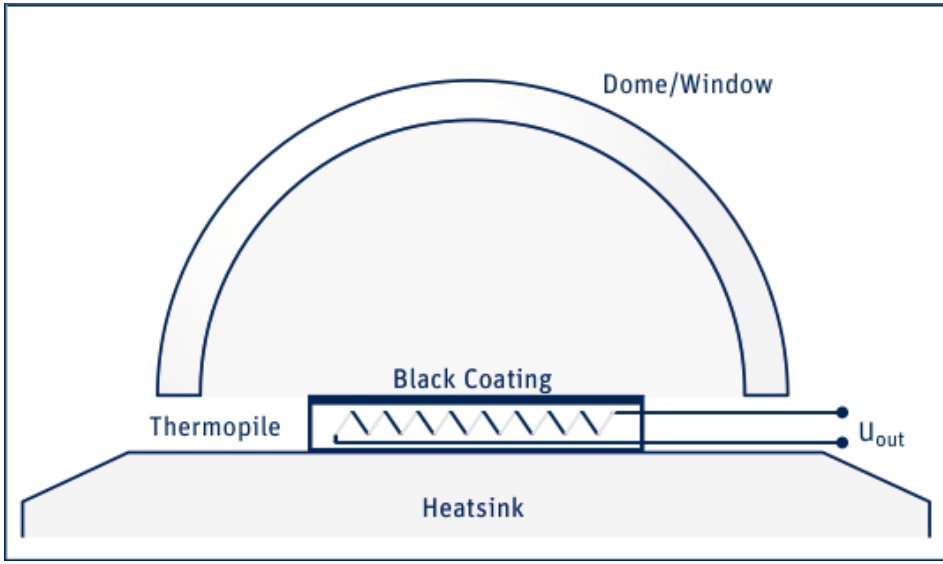
Solar Radiation Measurement

Pyranometer

- Pyranometer : Measures either global or diffuse radiation falling on a horizontal surface over a hemispherical field of view
- A black surface exposed to solar radiation
- Hot junctions of a thermopile attached to the black surface and cold under guard plate
- emf in the range of 0 to 10 mV can be read



Pyranometer

- **<u>Eppley Pyranometer</u>**:
- It uses concentric silver rings 0.25 mm thick with either 10 or 50 thermocouple junctions to detect temperature difference between coated rings

Pyranometer

- **Yellot Pyranometer (photovoltaic solar cell)**
- Silicon solar cells have the property that their light current is a linear function of the incident solar radiation

Pyrheliometer

- Pyrheliometer: Measures beam radiation falling on a surface normal to the sun's rays
- Black absorber plate at the base of collimating tube

Pyrheliometer

- **<u>Angstrom compensation Pyrheliometer</u>**
- A thin blackened shaded manganic strip (20*5*0.1 mm) is heated electrically until it is at the same temperature as a similar strip, which is exposed to solar radiation
- Under steady state condition the energy used for heating is equal to the absorbed solar energy

Pyrheliometer

- **<u>Abbot silver disk Pyrheliometer</u>**
- A blackened silver disk positioned at the lower end of a tube with diaphragms to limit the whole aperture to 5.7°
- Thermometer stem is bent through 90° so that it lies along the tube to minimize the exposure to the sun
- Their stability has been found very good

Pyrheliometer

- **<u>Eppley Pyrheliometer:</u>**
- A temperature compensated 15 junction bismuth silver thermopile mounted at the base
- The tube is filled with dry air and is sealed with a crystal quartz window which is removable
- It has found wide acceptance in the USA

Sunshine recorder

- The duration of bright sunshine in a day is measure by Sunshine recorder
- The sun's rays are focused by a glass sphere to point on a card strip held in a groove in spherical bowl mounted


Thank you!