UCIRC2:

EUSO-SPB2'S INFRARED CLOUD MONITOR

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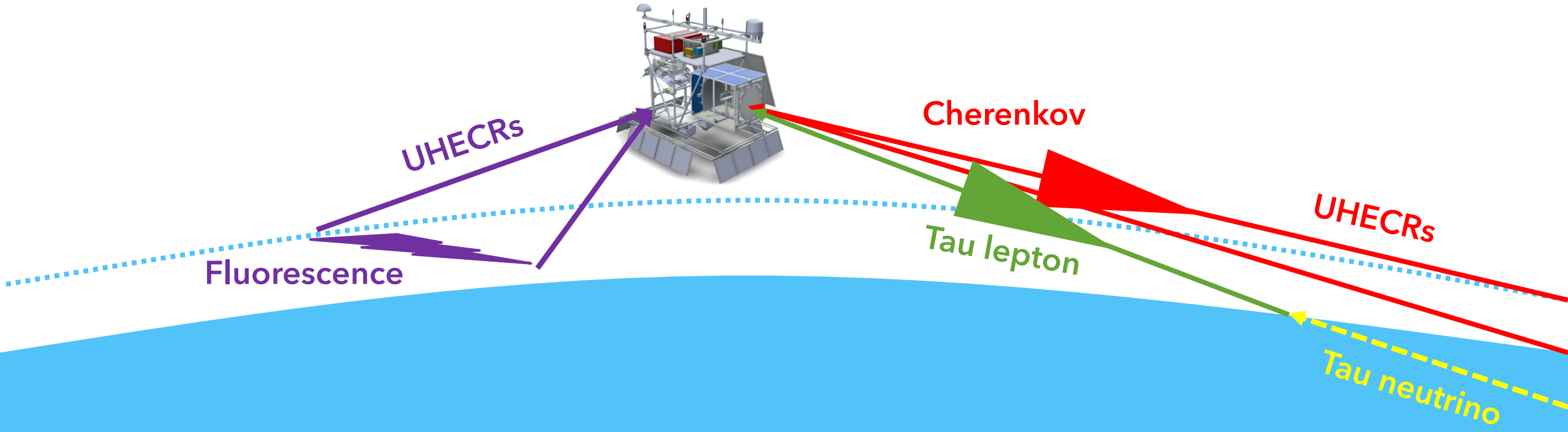
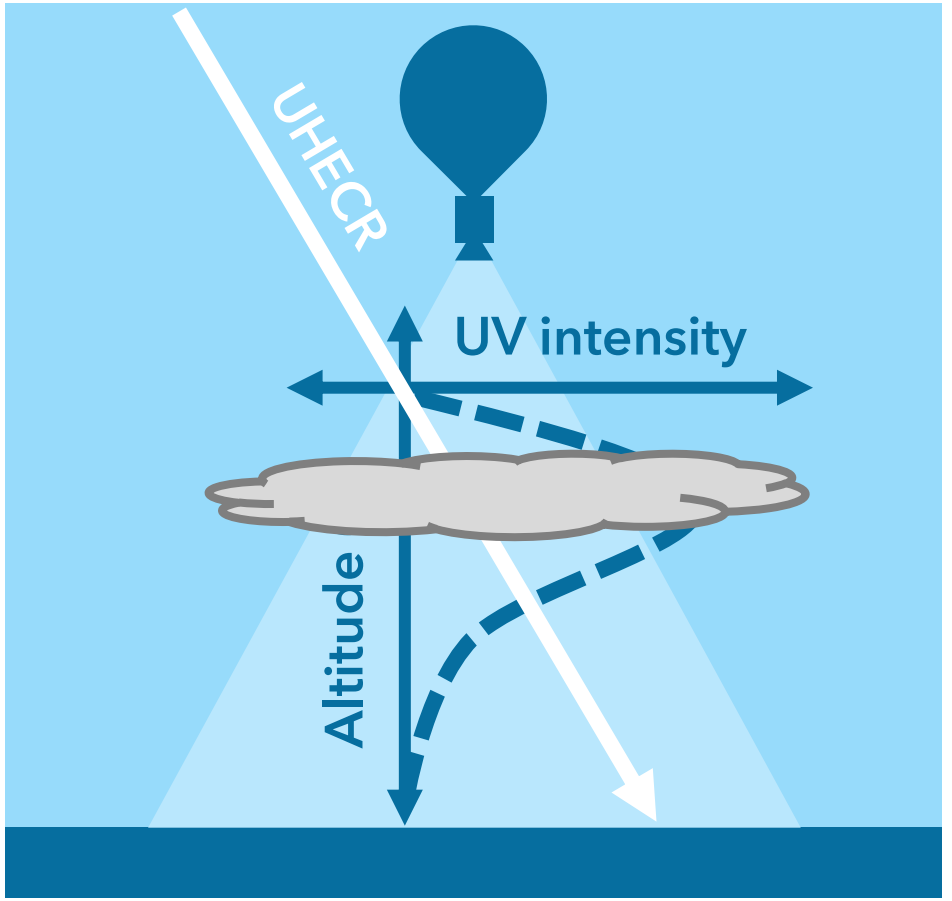
EUSO-SPB2

The Extreme Universe Space Observatory on a Super Pressure Balloon (EUSO-SPB2) will search for ultra high energy cosmic rays (UHECRs) and very high energy neutrinos. It is also a pathfinder for a more ambitious satellite mission, POEMMA.



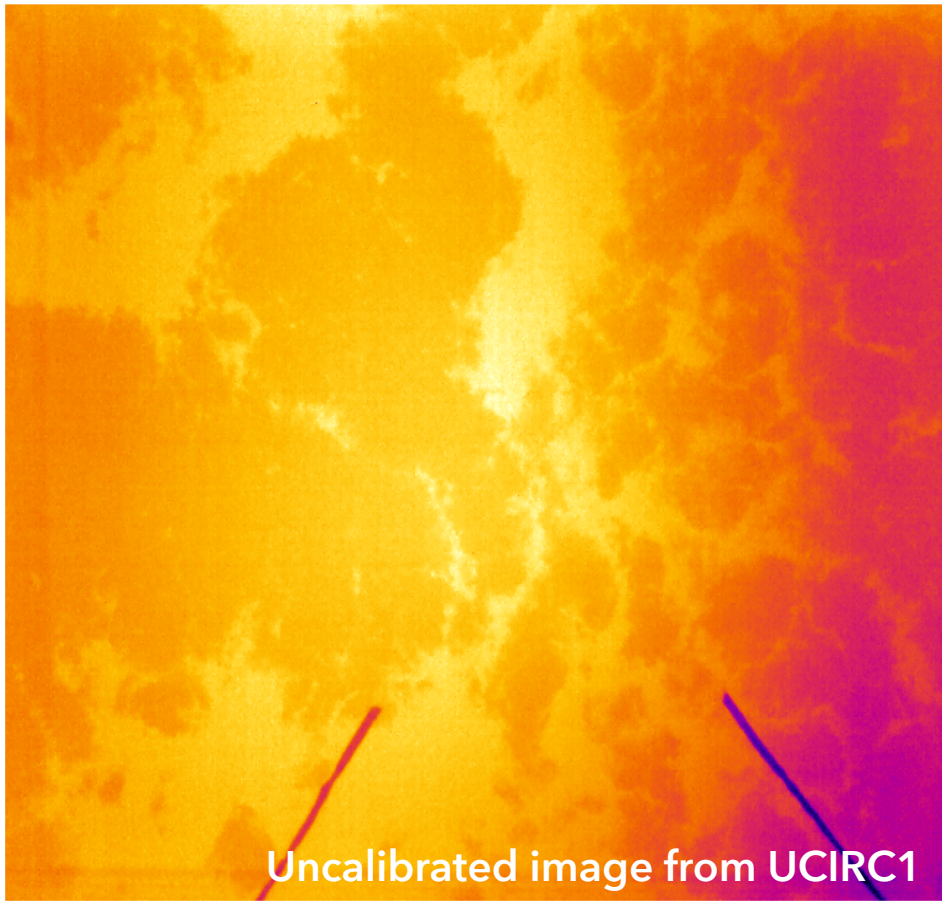
THE ROLE OF CLOUDS

The peak of an extensive air shower may occur below the clouds → clouds constrain EUSO-SPB2's geometric aperture.



CLOUD COVERAGE

Monitoring cloud coverage is straightforward with an IR camera.



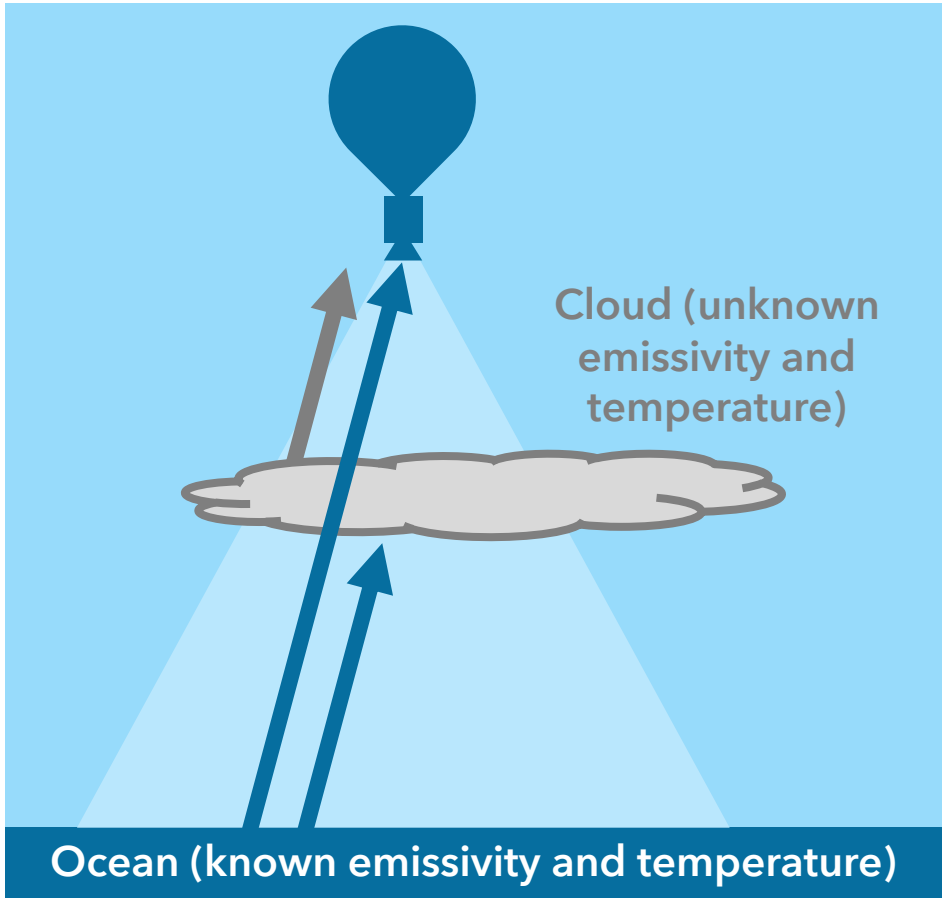
CLOUD ALTITUDE

Cloud altitude can be estimated from cloud temperature. In the simplest case, with one layer of clouds,

$$P_{TOTAL} = \varepsilon_{CLOUD} P_{CLOUD} + (1 - \varepsilon_{CLOUD}) P_{EARTH}$$

We disentangle ε_{CLOUD} and P_{CLOUD} using two frequencies near cloud blackbody peak

- Power ratio is independent of ε_{CLOUD}



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The University of Chicago Infrared Camera will consist of two IR cameras, each observing at a different frequency near the cloud blackbody peak.