

## **Relativistic Electrons in Blazars: A Hadronic Origin?**

Demosthenes Kazanas (NASA/GSFC), Apostolos Mastichiadis (University of Athens)

Recent observations of blazars have established that their gamma ray emission is associated, as a rule, with very fast variability (as short as  $\sim 15$  min for the TeV photons of Mkn 421); as such, these observations push the theoretical models for the production of the required relativistic electrons to their limits. Herein we investigate the possibility that “blobs” loaded with relativistic protons could produce such an activity. We show that, if the proton number density in a “blob” exceeds a certain critical value, then reflection of its own synchrotron produced photons on some external “mirror”, such as a line emitting cloud, can initiate a feedback process in which the protons can lose most of their energy content in a “blob” crossing time, resulting in a flare of the same duration. By performing a dimensional analysis we find the necessary conditions for such an instability to occur and we show that the conditions required are consistent with those usually assumed to prevail within the relativistic jets of this class of AGN.