Extreme flaring activity in S50716+714

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It is possible that the fast BL Lacs are actually quasars in disguise, with their broad emission lines swamped by the non-thermal optical continuum.

S5 0716+714 : An Extremely Variable Blazar

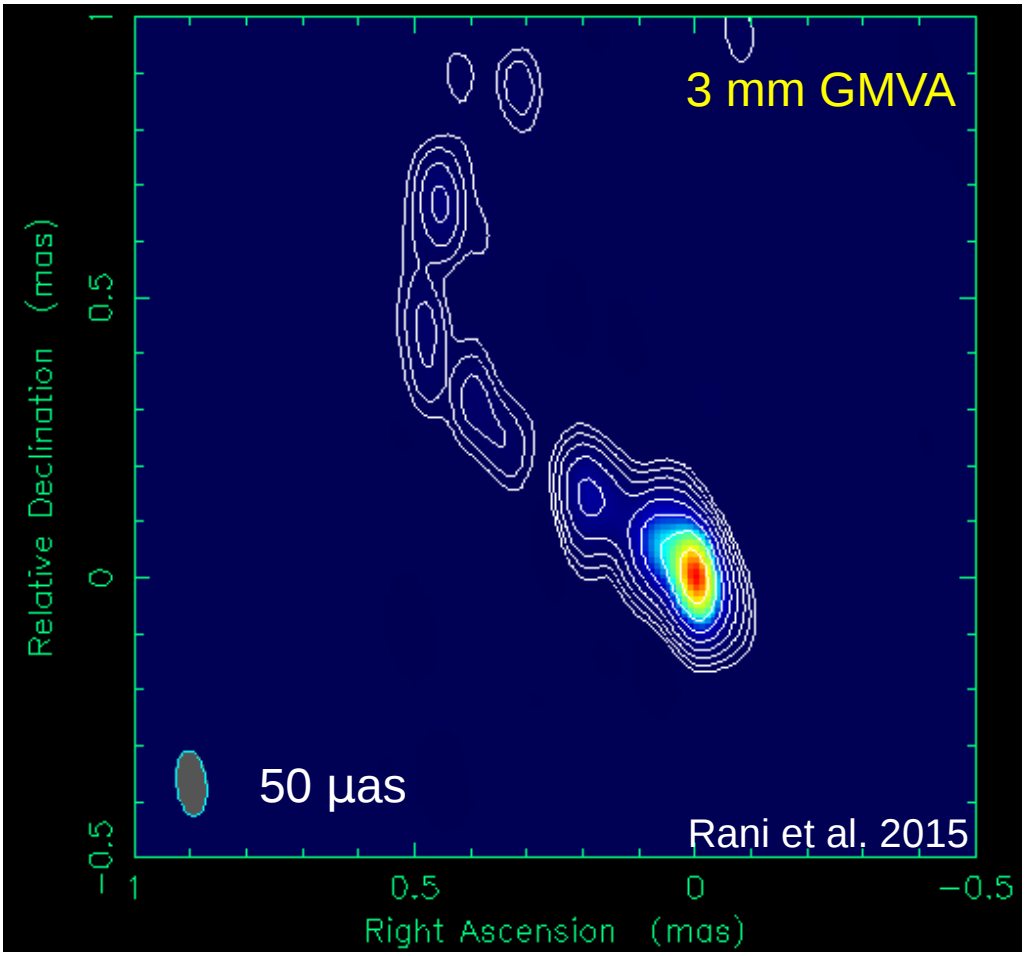
Mass : ~10^9 M_o

Redshift : z ~ 0.3

Jet Kinematics : θ<5°

Blazar with a featureless spectrum

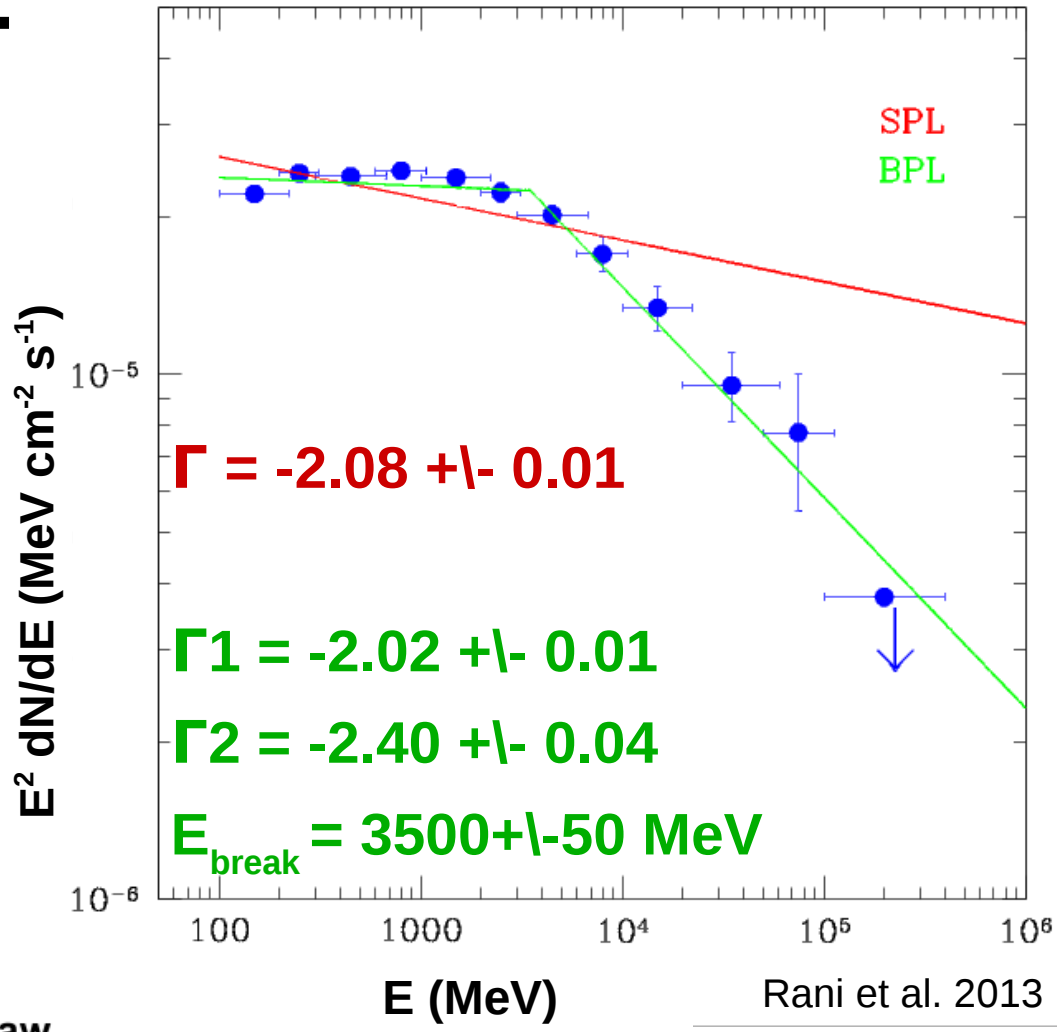
Luminosity distance : ~1.5 Gpc (~5 Gly)



A high polarized (~60%) micro flare has been recently reported (Gopal's poster)

GeV spectrum

Origin of spectral breaks is still an open question



Rani et al. 2013

PowerLaw simple power law

$N(E) = N_0 (E/E_0)^{\Gamma}$

N_0 :Prefactor, Γ:spectral index

E_0:energy scale

BrokenPowerLaw two component power law

$N(E) = N_0 (E/E_b)^{\Gamma 1+1}$ E<Eb

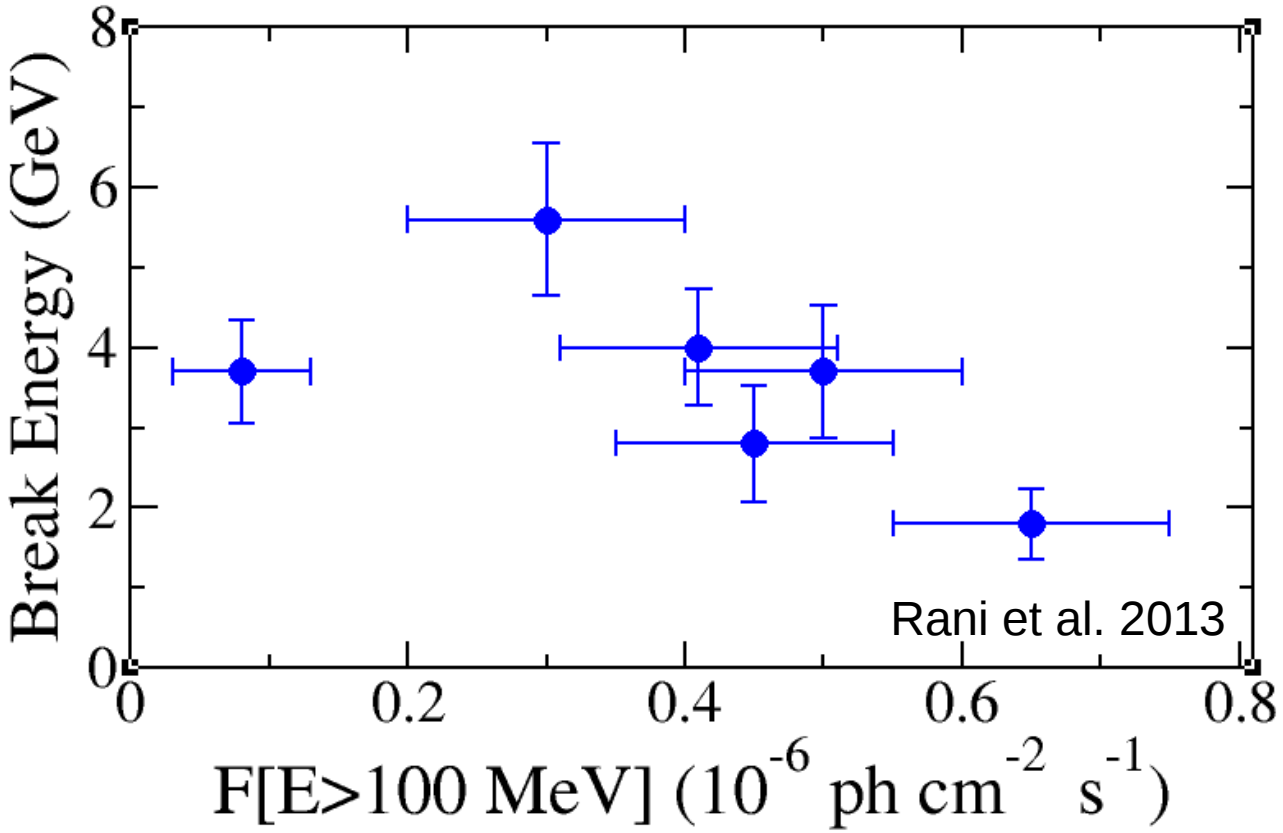
$= N_0 (E/Eb)^{\Gamma 2+1}$ E>Eb

N_0 :Prefactor Γ1:low energy spectral index Γ2:high energy spectral index

Eb:break energy

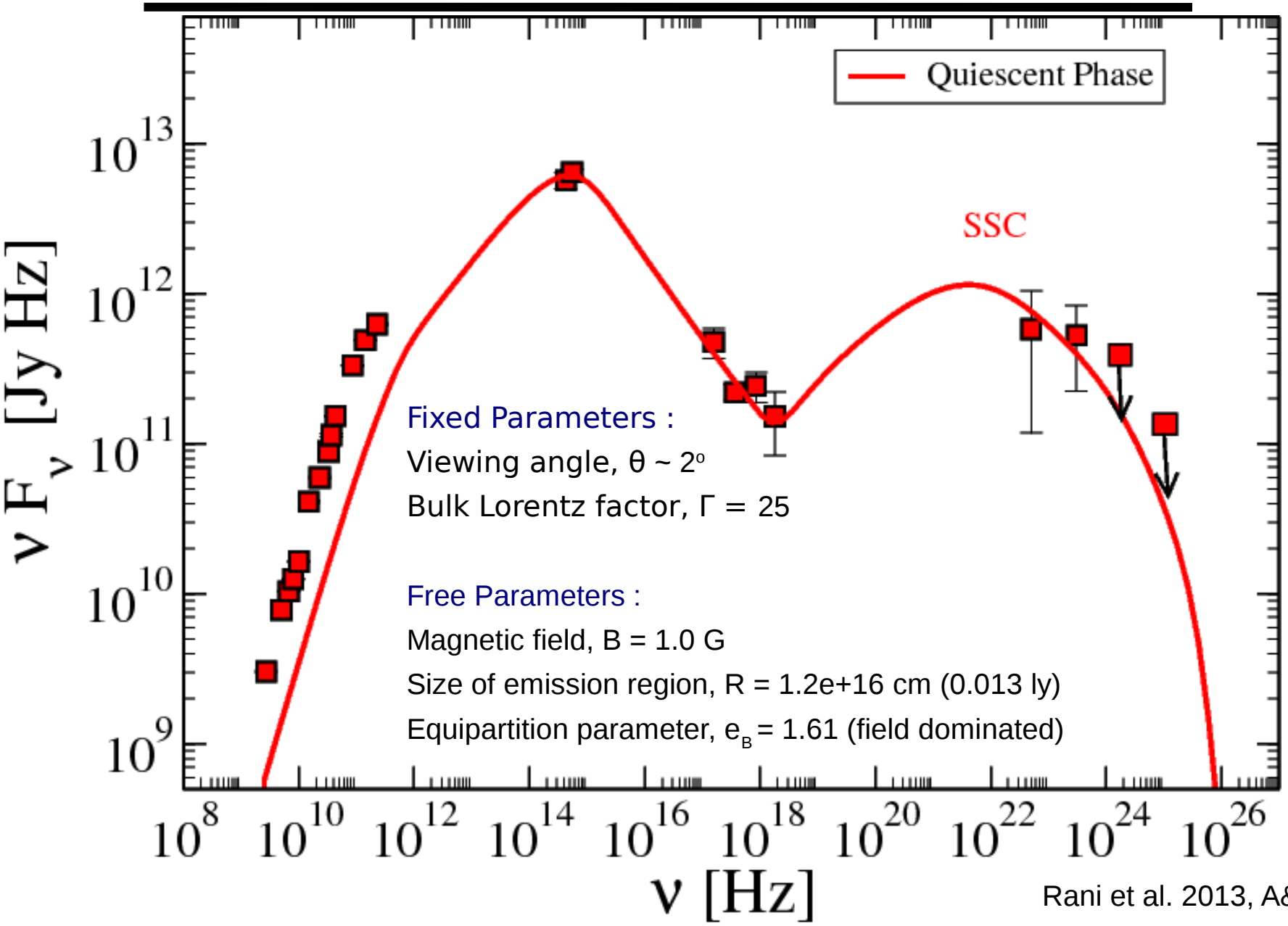
Spectral Variations

Change in spectral slope varies between 0.4 to 1.14



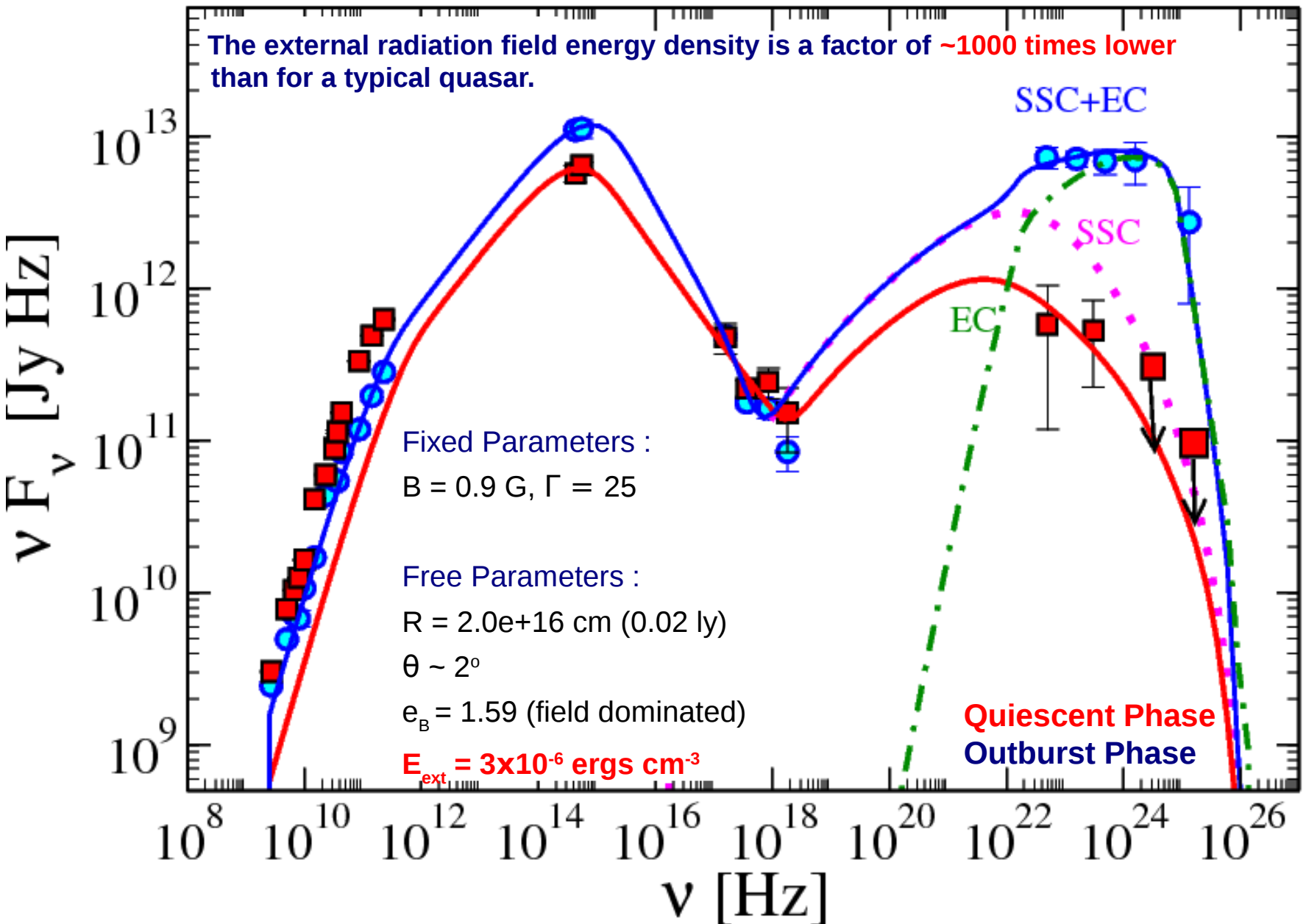
No clear correlation between break energy and source brightness

Spectral Modeling : SSC

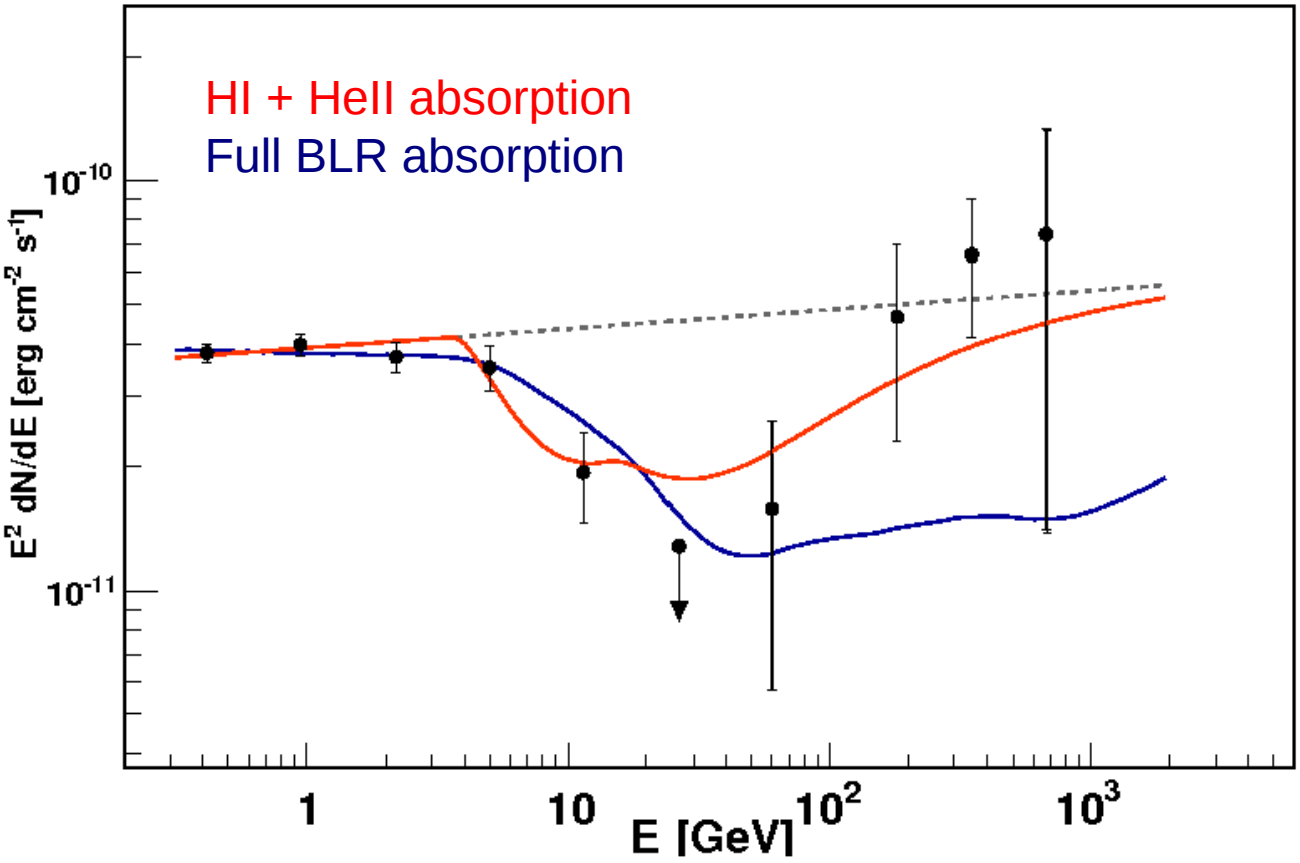


Rani et al. 2013, A&A

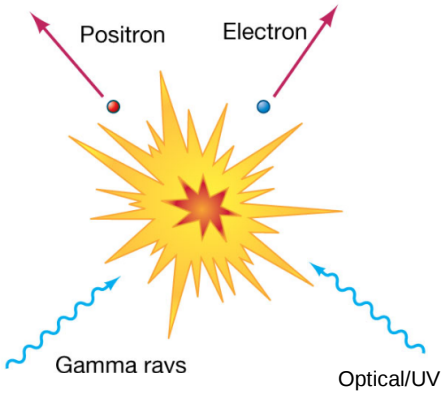
Spectral Modeling : SSC + EC



Gamma-gamma absorption in a gas deficient BL Lac

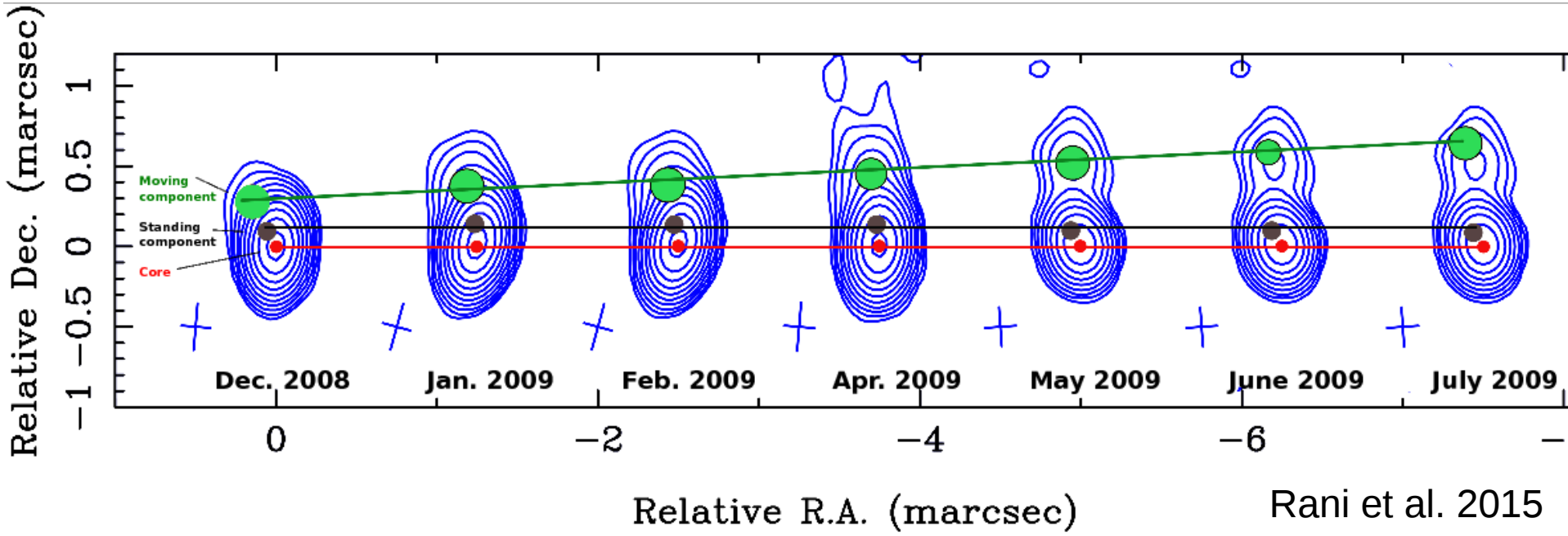


Absorption via pair production



High energy photons are absorbed via interaction with the optical/UV photons in the broad-line region (BLR).

Apparent motion



Rani et al. 2015

In radial directions, the individual components exhibit extreme apparent speeds as high as ~37 c.

Recently, Lister et al. (2013) have reported an apparent speed of 43.6 ± 1.3 c.

These values would even be extreme for a quasar.

Summary

Similar spectral features in BL Lacs and FSRQs

Brodband SED cannot be explained via SSC mechanism

Similar apparent speeds

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Thank you for your attention