# Multiphase outflows in compact radio galaxies: the case of PKS1934-63

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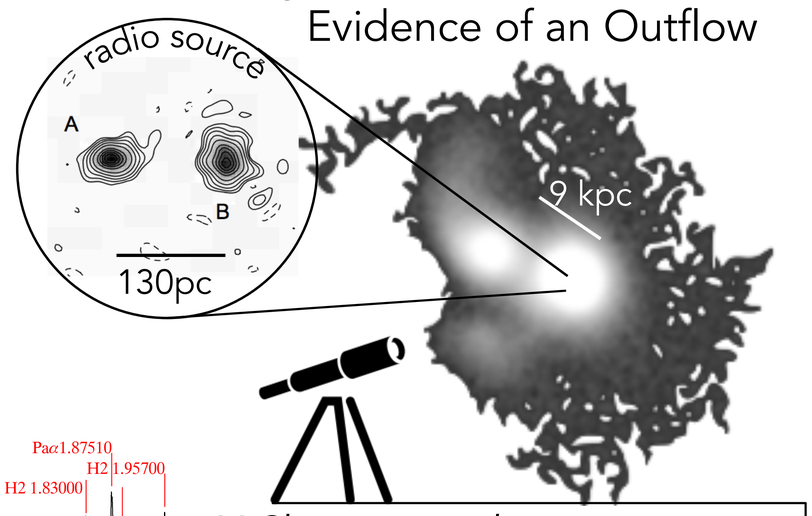
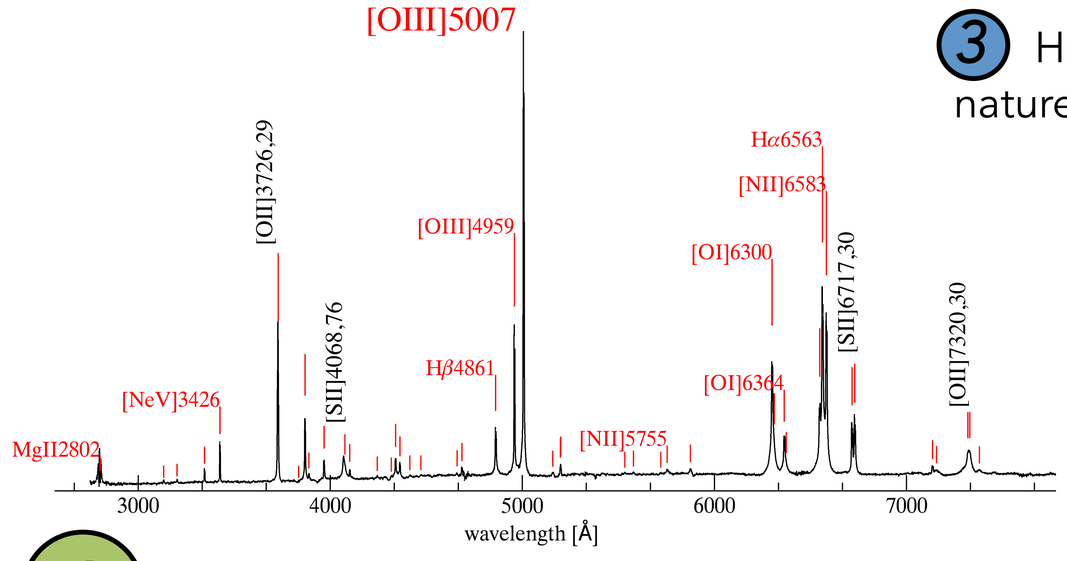
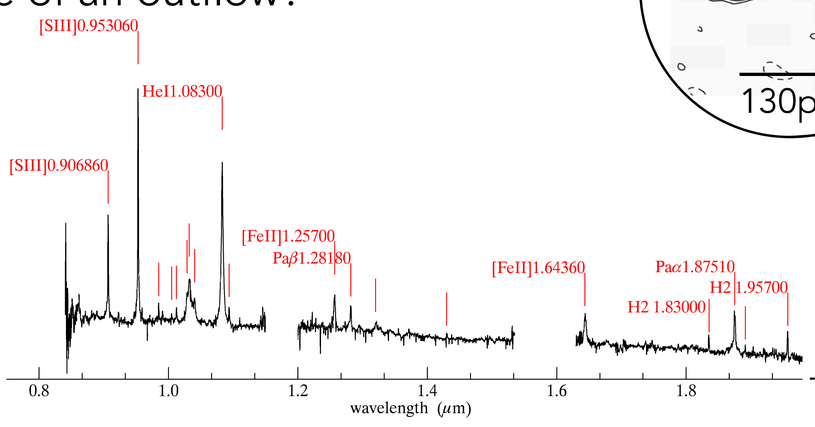
**Compact radio galaxies** are young radio-loud AGN, ideal to study the first stages of AGN feedback.

1. Is the AGN feedback efficiency close to the 5% required by classical models?
2. Is the AGN-ISM interaction driven by shocks ?
3. How to explain the multiphase nature of an outflow?

**PKS1934-63**
Compact GPS source
Merging system
$P_{1.4GHz}=10^{27.2}$ W/Hz
Evidence of an Outflow

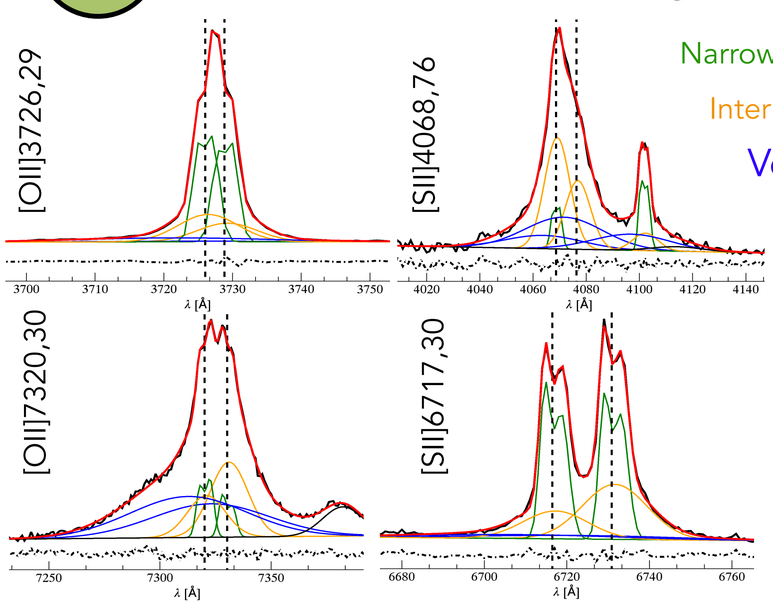



*X-Shooter nuclear spectrum*

## 1 Outflow efficiency? Density matters!




Narrow components
Intermediate Component
Very Broad Component
**IONIZED GAS OUTFLOW**

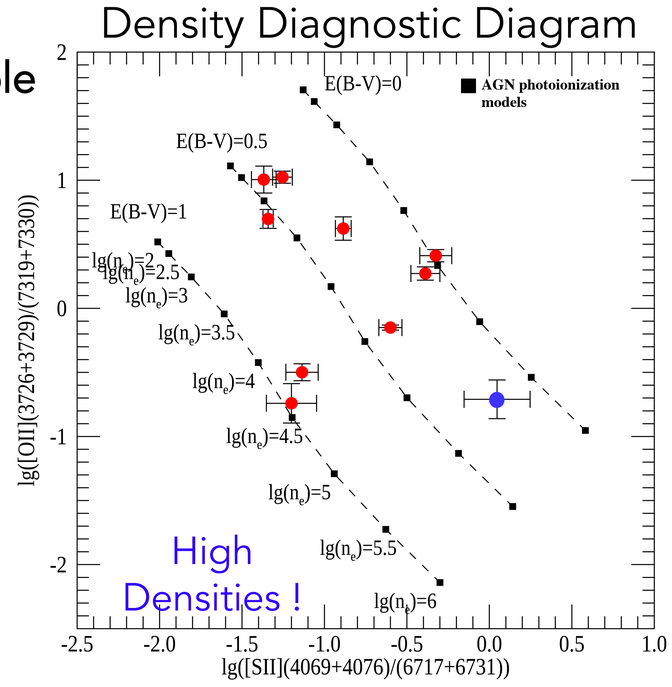
$$\dot{M} \propto \frac{L(H\beta)\, v_{out}}{n_e\, R}$$

$$\dot{E} \propto \dot{M}\, v^2_{out}$$

$$\text{Efficiency} = \dot{E}/L_{bol}$$

Our Sample
**PKS1934**
PKS1733
3C459
PKS0023
PKS0252
PKS1151
PKS1306
PKS2135
PKS1549
PKS1345

Density Diagnostic Diagram

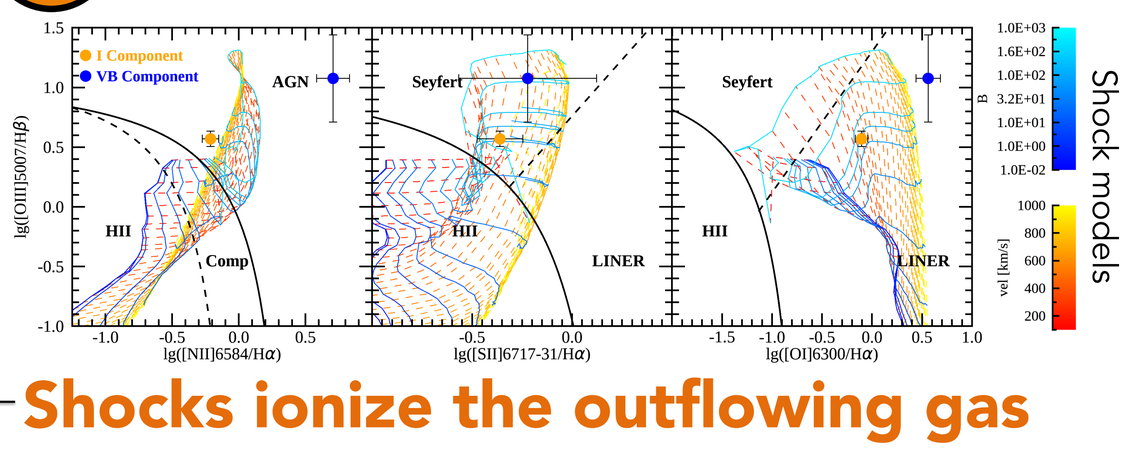



**0.01<Ṁ<3 $M_\odot$ /yr**

**$10^{-4}$<Eff<1.5 %**

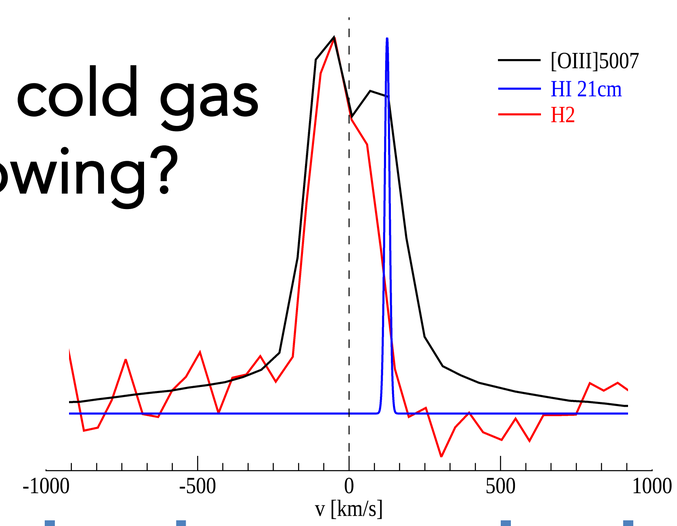
**The efficiency of AGN feedback is lower than 5% predicted by classical models**

## 2 Is the AGN driving shocks ?




**Shocks ionize the outflowing gas**

## 3 Is the cold gas outflowing?




**No neutral and warm molecular outflow**

Is the cold gas forming in-situ within AGN-driven outflows? With compact radio galaxies we can test this!

***… a possible scenario …***