# On the role of accretion and spin in powering AGN

and the connection between jet power and accretion power in AGN Deep studies of relativistic jet production from massive spinning BHs at the core of an accretion disk by

Narayan, Mc Kinney and Tchekhovskoy (2012)

have recently produced important results demonstrating that high efficiency is reachable ! In fact for maximum BH spin the ouflowing energy is larger than the incoming one, showing that

energy is indeed extracted from the Rotation of the BH !

(movie at http://youto.be/nRGCNaWST5Q)

### **The Blandford Znajek mechanism (1977)**



illustrated by Macdonald and Thorne (1982)



## Revisiting the B – Z formula



Where  $\Omega_{\rm F}$  is the rotation freq. of the mag.field lines and  $\Omega_{\rm H}$  that of the BH

 $L_{BZ} > 0$  only if  $\Omega_F < \Omega_H$ 







### The fundamental AGN plane

No jet a < 0.5 ? a > 0.5 Powerful jet



### SUMMARY

The BZ process contains a "physical" scaling, the magnetic energy flux, which is proportional to the accretion power. Recent simulations of jets (TKN 12) show that indeed, for high values of the BH spin, the jet power reaches values of the order of the accretion power.

This clarifies why the properties of the accretion flow (ADAF or Standard SS accretion disk) and the power of the jet are strongly related so that weak jets live in slowly accreting objects while powerful jets are produced at high accretion luminosities.

This basic concept explains the "blazar sequence" and the overall systematic Gamma-ray properties of blazars in the FERMI survey.

More generally we can envisage a "unified model" of AGNs in terms of only three parameters, mass, accretion rate and spin.