Fast Outflows in X-raYs (FOXY)
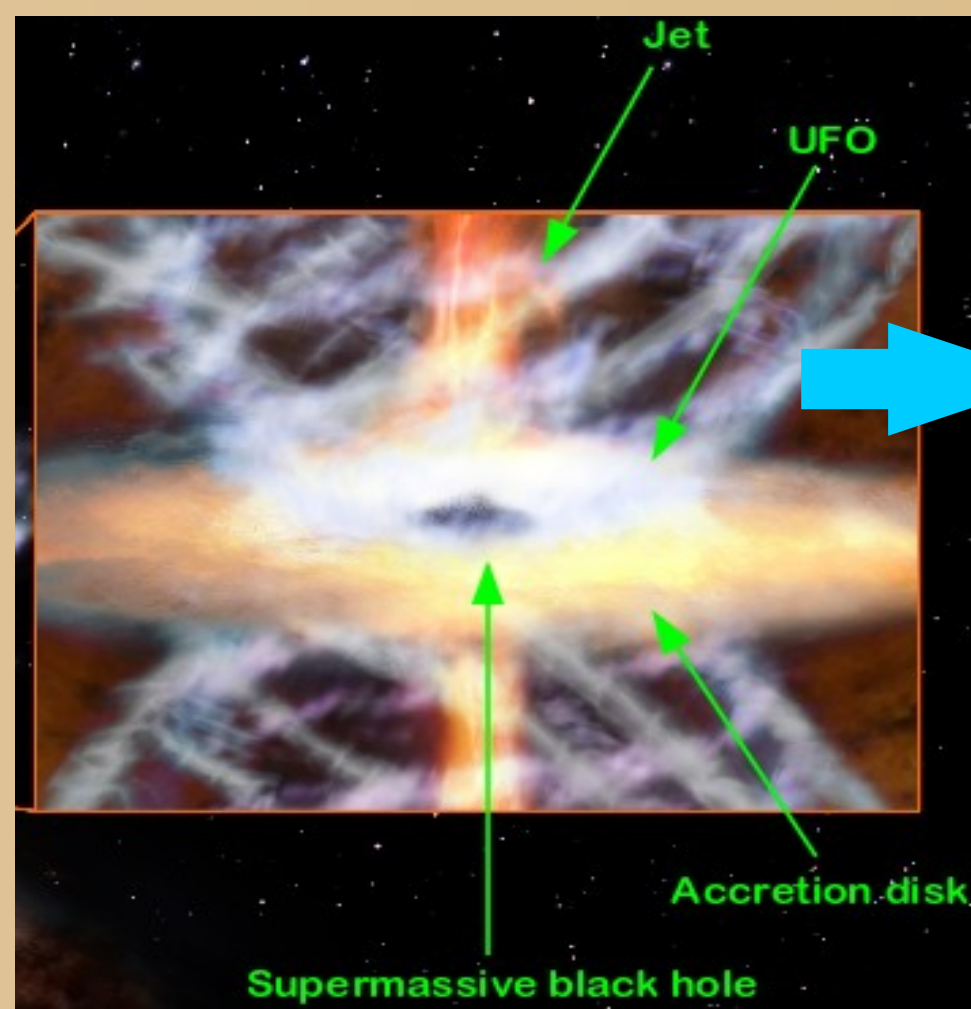## Main Pal , Labani, Sudip, Pramod, Susmita

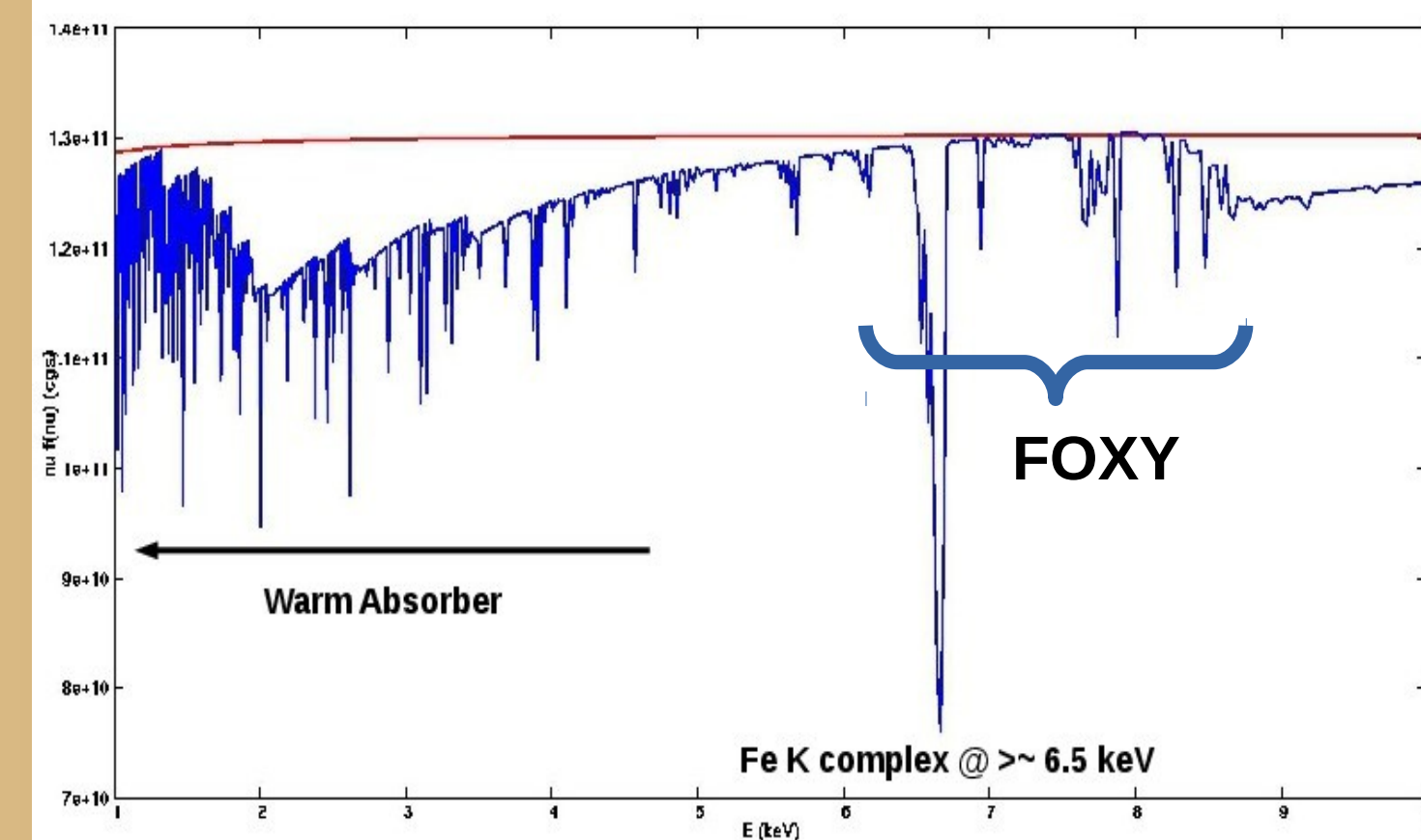## Introduction

- UFO: v~0.03-0.33 c, c is light speed.
- Distance : 100-10000 R_s
- Column density ~10^{22-24} cm^{-2}
- Mass outflow: ~0.01-1 M_o/yr
- Signature: Blue shifted Fe XXV-XXVI
- Why UFOs: AGN feedback, Jet collimation
-

Courtesy: F. Tombesi

Objective: Photo-ionization modeling of Fe XXV/XXVI absorption lines in NGC 1365 using CLOUDY

- **AGN SED: Blackbody with T=10^4 K, Γ = 1.9**
- **Number density $n_H = 10^{10}$ cm^{-3}**
- **Ionization parameter - log ξ ~ 3**
- **Column density NH = 10^{23} cm^{-2}**
- **At Solar metallicity**

- **We ran these models in Cloudy to obtain model templates**

Cloudy template for FOXY

FOXY

Warm Absorber

Fe K complex @ >~ 6.5 keV

Parameters of the Considered Fe XXV and Fe XXVI K-shell Transitions

Ion	ID	Transition	$\langle E \rangle$ (keV)	Line	E (keV)	f_{lu} ($\times 10^{-2}$)	A_{ul} ($\times 10^{12}$)
Fe XXV	Heα	$1s^2-1s2p$	6.697	(r)	6.700	70.4	457
				(i)	6.668	6.9	44
	Heβ	$1s^2-1s3p$	7.880	(r)	7.881	13.8	124
				(i)	7.872	1.7	1
Fe XXVI	Lyα	$1s-2p$	6.966	(r_1)	6.973	28.0	296
				(r_2)	6.952	14.0	293
	Lyβ	$1s-3p$	8.250	(r_1)	8.253	5.3	79
				(r_2)	8.246	2.6	78

Done and to be done

Our learing from the workshop

- First amazing experience with CLOUDY of our group
- Creation of fits table model compatible with ISIS and XSPEC fitting softwares
- Success

Future work

- Varying Fe abundance and turbulence velocity
- Cloudy code is running in 8 cores CPUs since yesterday evening.
- We are learning to optimize our calcalculation by modifying actual code of CLOUDY.

Results for observed cloud: column density ~10^{23}cm^{-2}, V_{out} ~0.02
- Log xi~2.5