

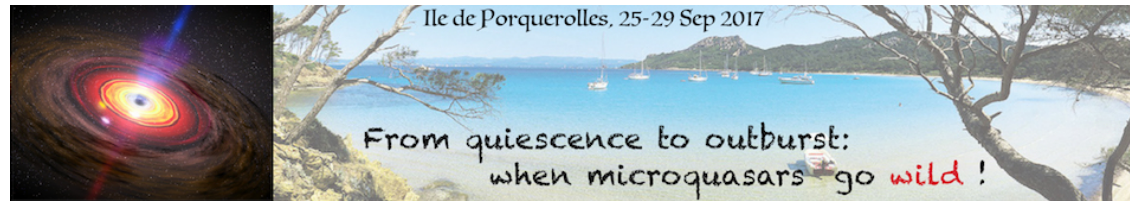
Conference Summary

J. Wilms

...plagiarizing illustrations from many talks without attribution



General impressions



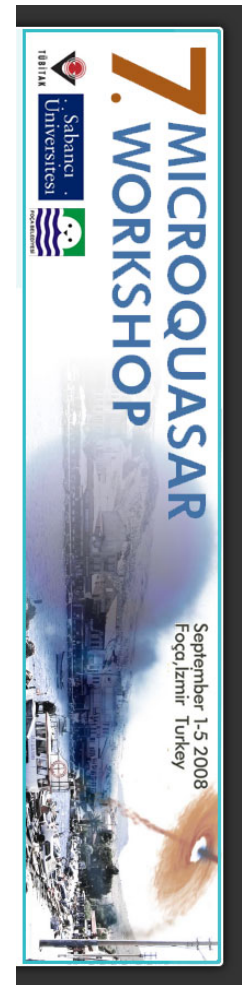
- **Field has progressed since Foça and Como:**
 - Impressive multiwavelength campaigns [V404 Cyg!]
 - VLBI rocks
 - MHD disk and jet modeling
 - NICER will be extremely valuable
- **We are a healthy community, with a good mixture of empiricists and theorists.**

But we are too nice to each other – Is this because all of our big questions are solved? OR is it because we're all too much thinking in the box? What about the next generation?

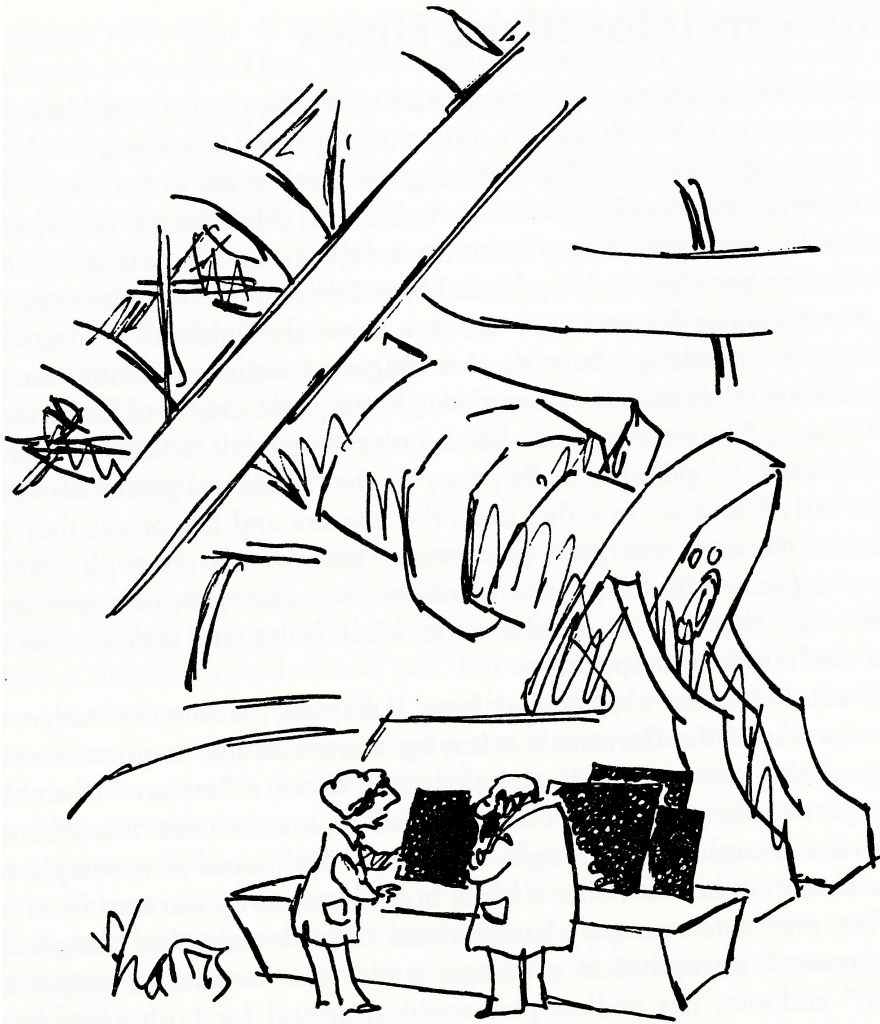
- **Disconnect** between “timing people”, “jet people”, “disk people”

Meetings such as this one help

⇒ need higher frequency of MQ meetings



Selling the field



"It's black, and it looks like a hole. I'd say it's a black hole."

We need to be clearer about our big questions:

- **Are there black holes?**

Are BH binaries typical? What about the GW BH-BH binaries?

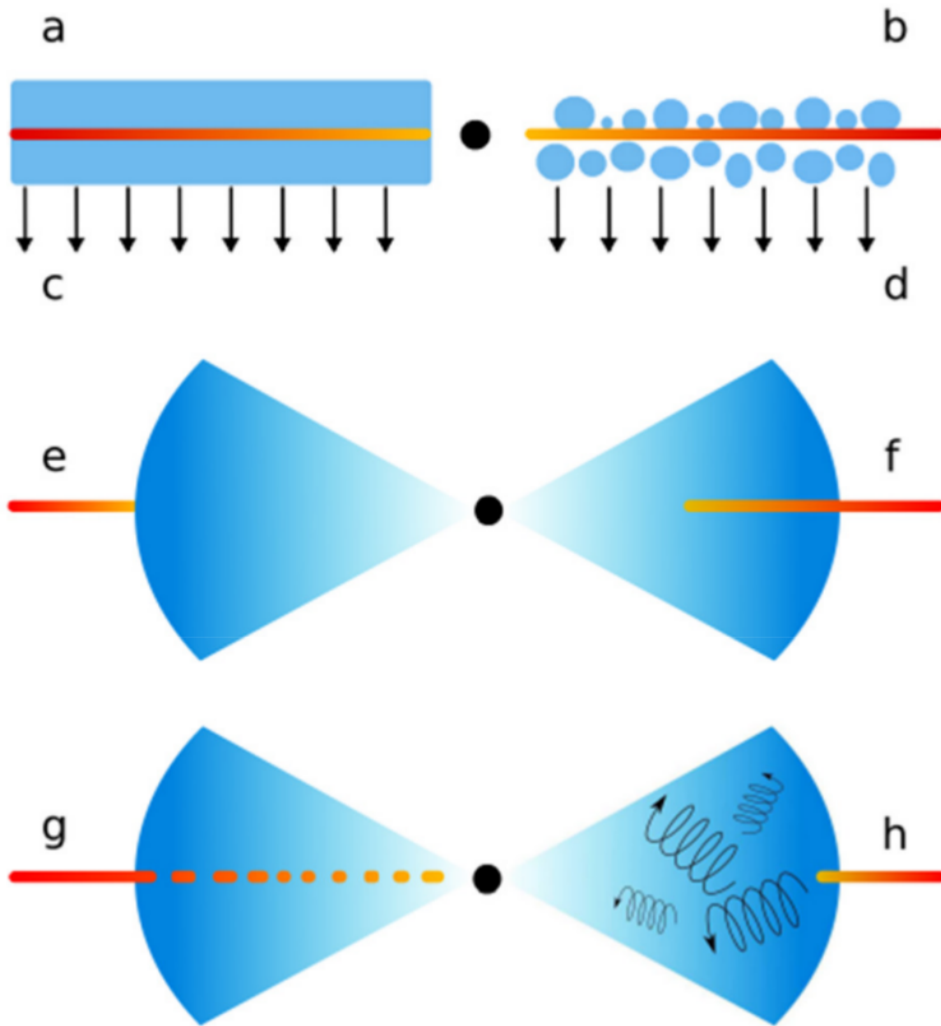
- **What is the physics of accretion?**

Accretion as one of the most fundamental physical processes in the Universe \implies BH-XRB/AGN best way to study them!

- **How do black holes interact with their environment?**

e.g., XRB: energetic input into ISM, AGN: galaxy evolution ("feedback"), heating IGM,...

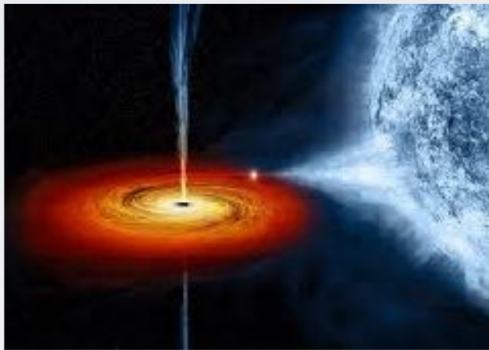
Open Questions: Semantics



- **Difference between an accretion disk and an inflow**
- **Wind versus jet versus outflow:** Is the “corona” static? An inflow? A outflow?
- **The term “corona” is sloppy, unclear, and causes confusion**
“corona = Region where the power law component is produced” – but many models are so complicated, that the simple term “corona” should be avoided

Open Questions: Accreting Systems

- **States:** clear in BHs, more unclear in AGN than many speakers imply.
⇒ Many of us are too certain about the analogous objects!
e.g., power spectral shapes, disk vs. corona dominated
- **Are states discrete entities or is there a continuum of behaviors?**
jet vs. no jet; but other quantities vary smoothly



Stellar-mass BH

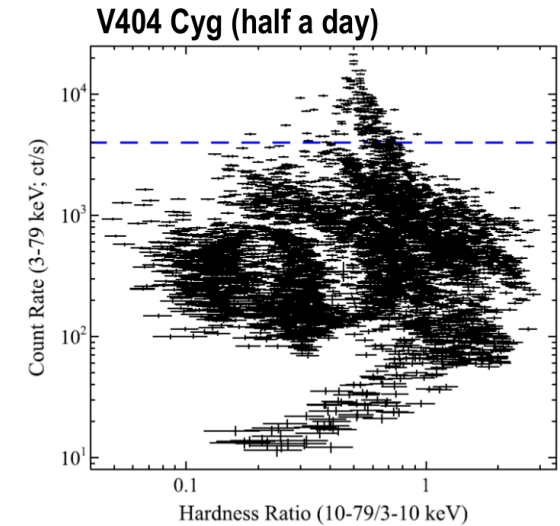
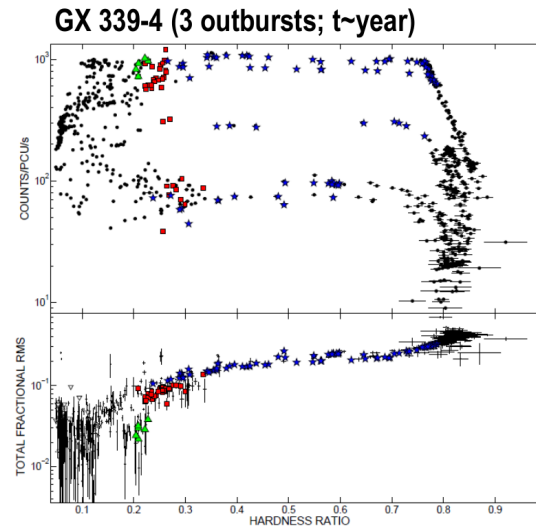
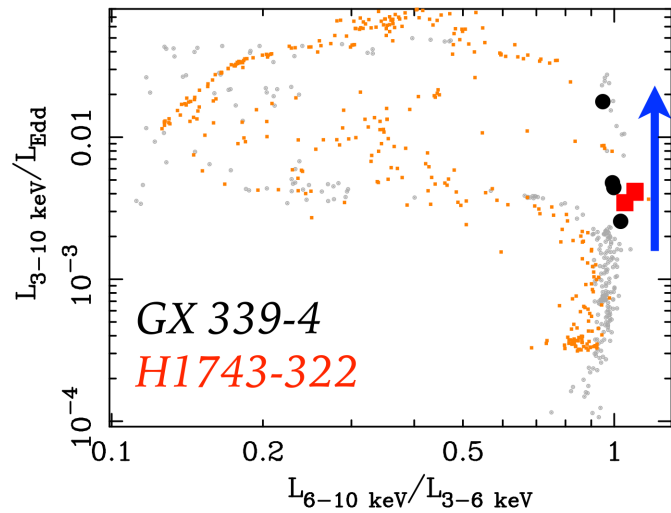


Supermassive BH

- **There is more to BH-XRB than GX 339–4, V404 Cyg, and Cyg X-1**
- **Need to understand when we can use CVs, AGN, ULX as analogons (and when not).**

And we *have* to look more at the common properties than many of us do.

Open Questions: Diagnostics



The curse of the turtle.

- There is *much more* to spectroscopy than colors!

Open Questions: Diagnostics



The curse of the turtle.

- There is *much more* to spectroscopy than colors!
- Ignored diagnostics:
 - **Timing**: There's more than the rms!
 - **Frequency dependency of timing parameters is too often ignored**
There is no such thing as “the lag”!
 - **Archives are underutilized**
e.g., RXTE (hint: <http://www.sternwarte.uni-erlangen.de/~wilmsrxte>); but also radio data not yet centrally archived,...

Open Questions: Diagnostics

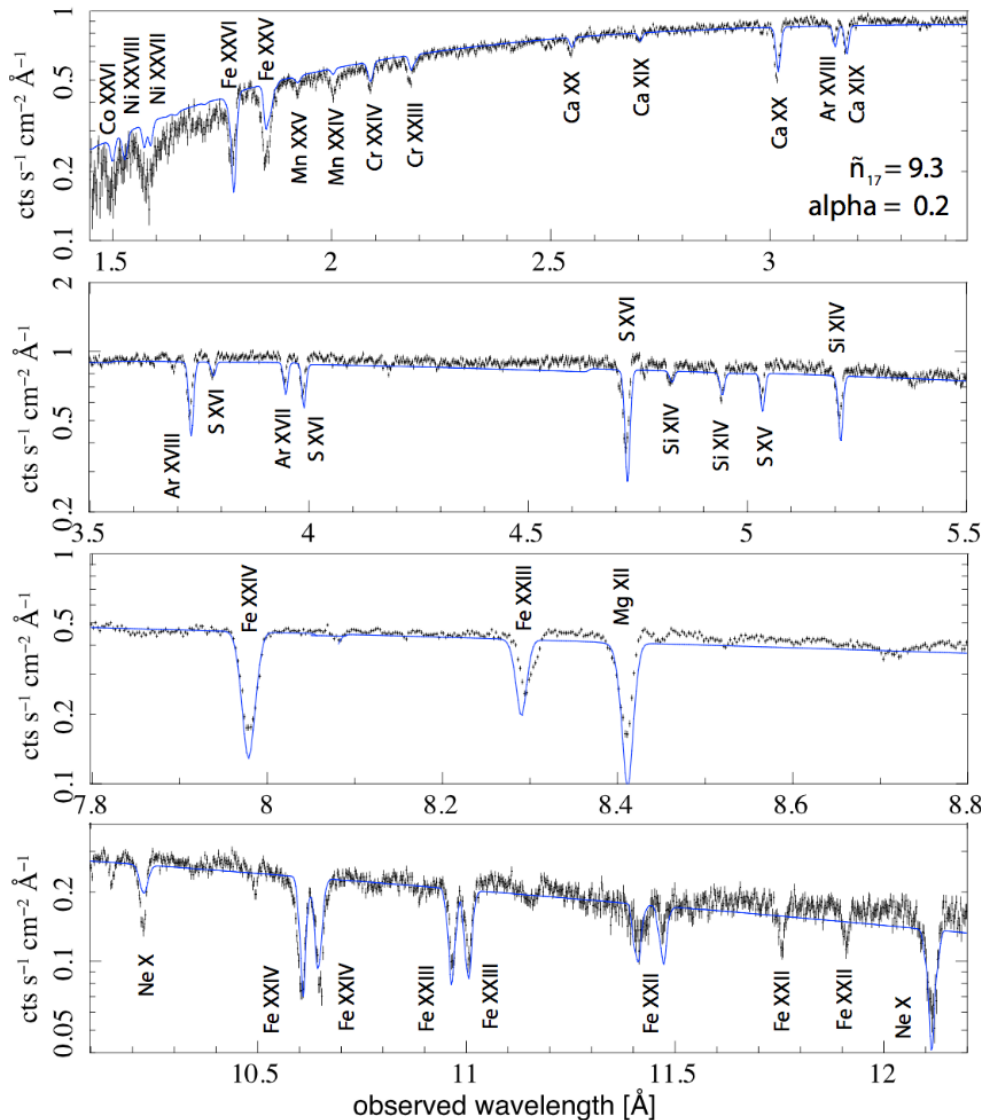


The curse of the turtle.

- There is *much more* to spectroscopy than colors!
- **Not many hard numbers in talks** \implies **we need to be quantitative, not qualitative!**

Comptonization models, jet models, line diagnostics, quantitative MW fitting... Yes, this is more work, but also results in much stronger constraints and clearer statements.

Open Questions: Diagnostics

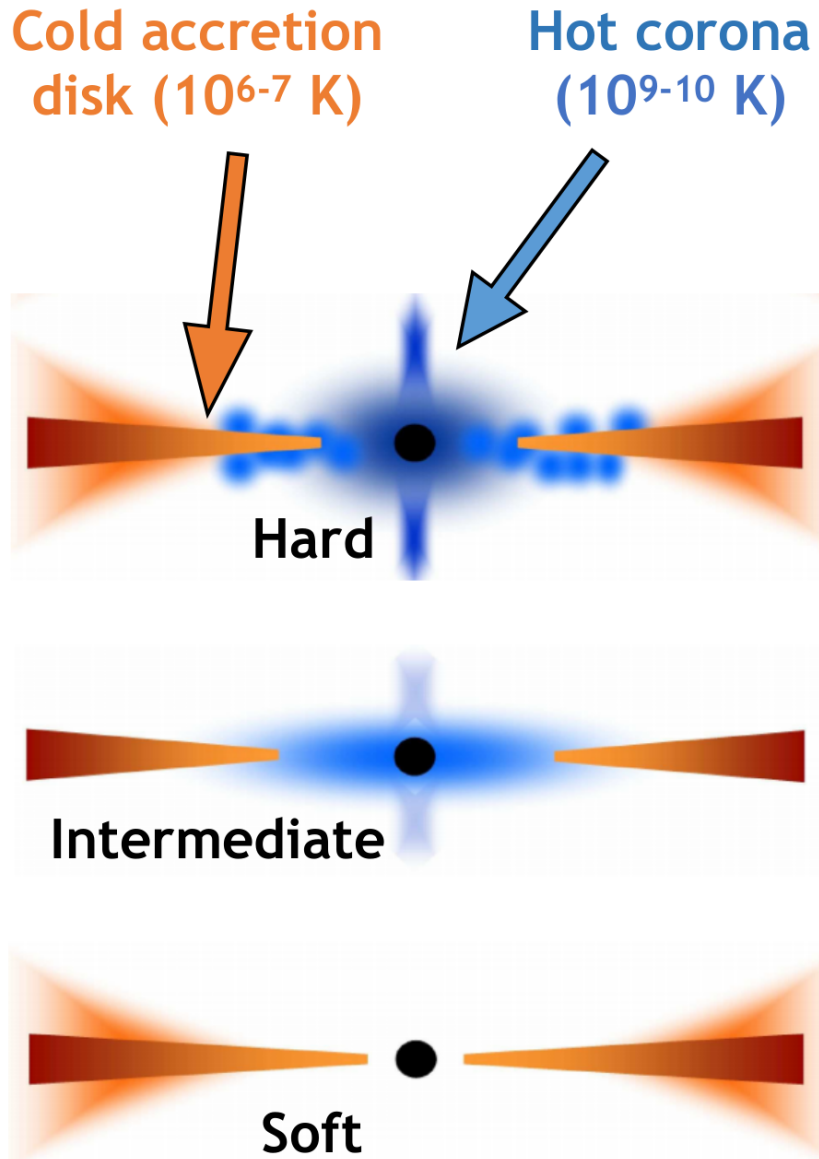


- **High resolution X-ray spectroscopy**: seen as niche, but important for diagnosing the conditions in the accretion flow and its surroundings

Hitomi data analysis would have been embarrassing to many of us...

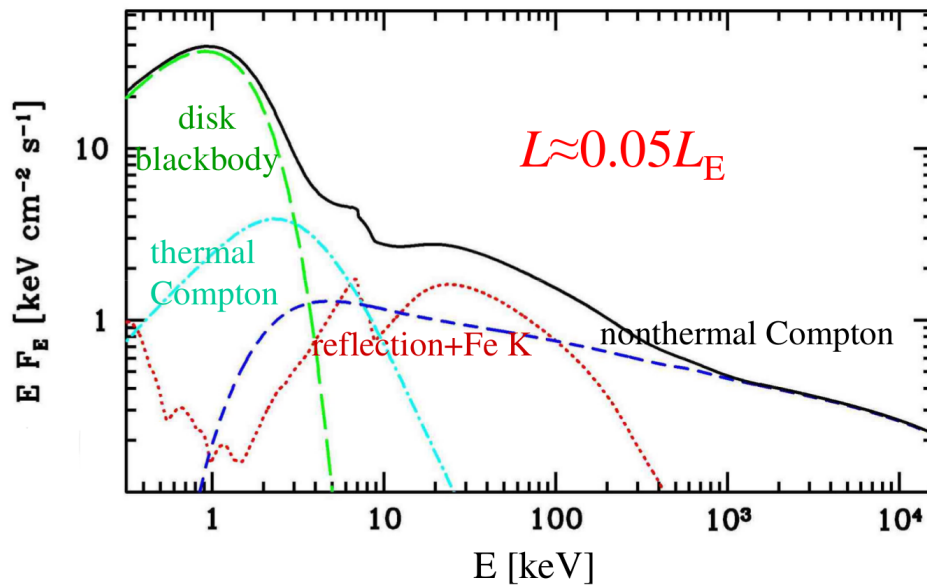
- **MHD winds versus thermally driven winds**. What is the diagnostics?
- **We ignore the outer boundary condition** – Roche lobe, wind accretion, influence of the foreground (e.g., scattering halos in the soft)

Open Questions: Modeling



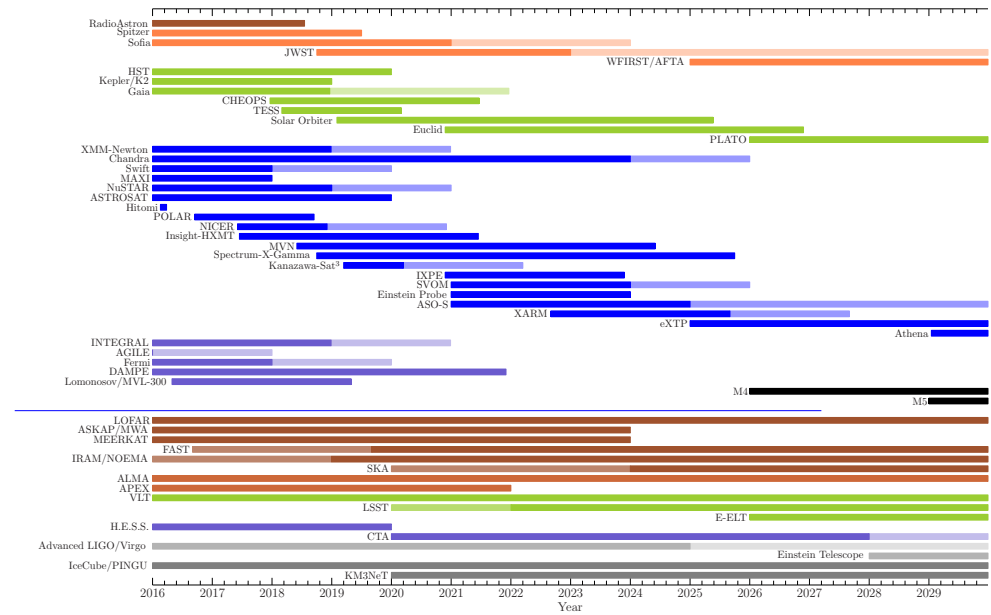
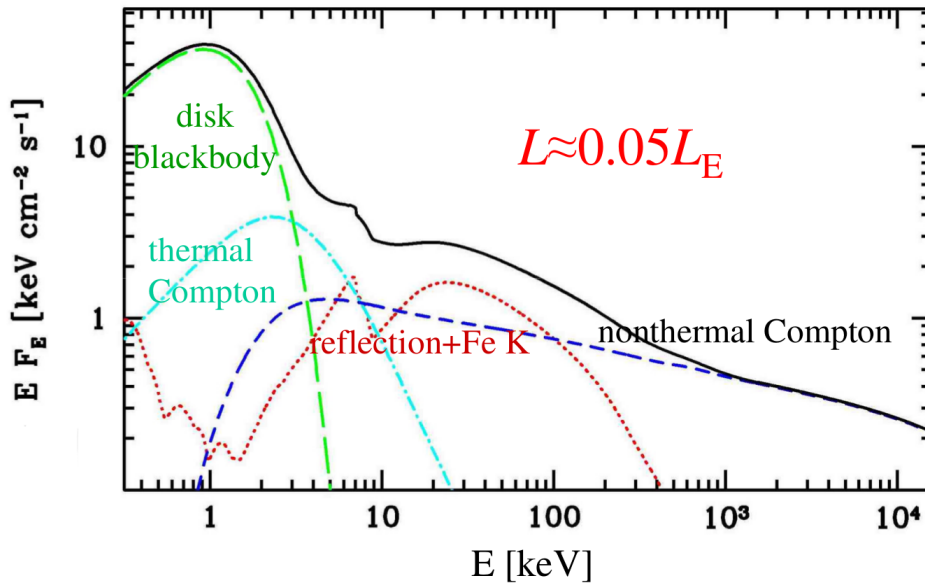
- **The curse of the Esin-plot** – inner edge: static or moving?
- **need modeling with predictions that can be observationally tested**
i.e., even if you have limitations, at least try to phrase results of simulations in something that is observable
- **Thermal versus non-thermal electron distributions**
- **Are we sure we *need* the black hole?**
Are we sure that we need GRMHD?
Accretion flows around YSOs, CVs \implies split of community not good. Yes, “black hole” is a sexy term, but is this concept distracting us?

Open Questions: Facilities



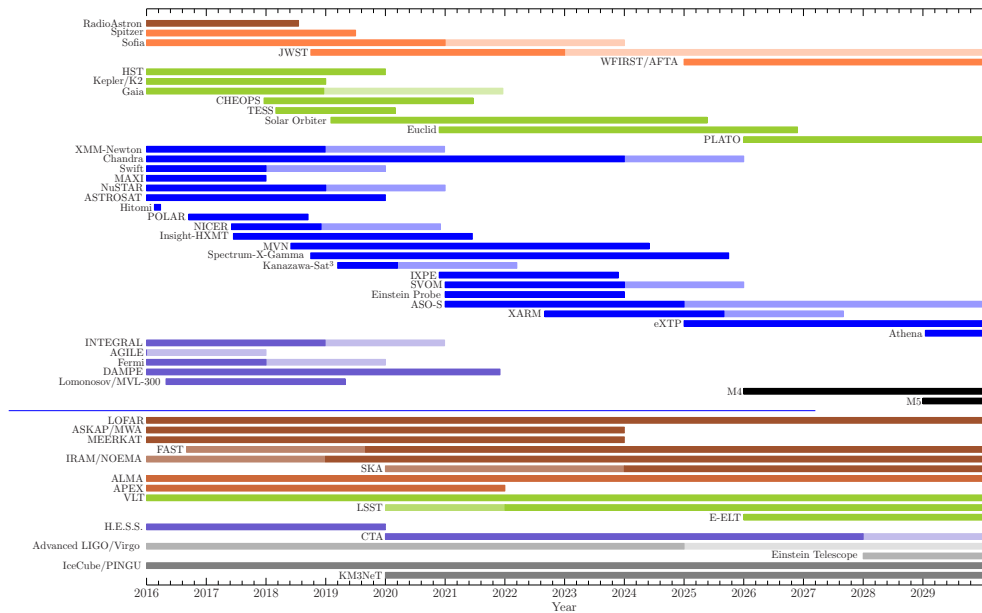
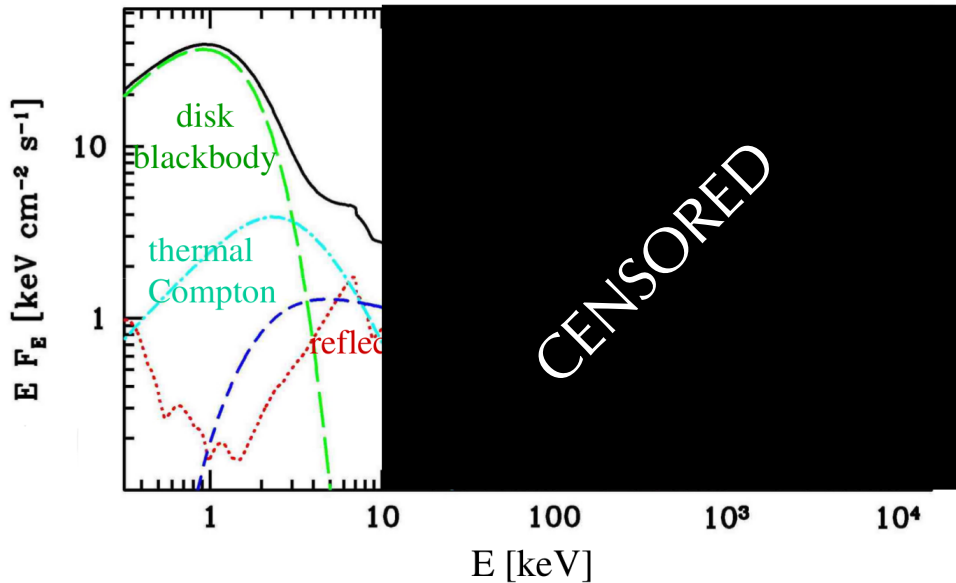
- There will be no good X-ray transient finders in the 2020s
Opt/Radio [SKA] might help, but different selection function?

Open Questions: Facilities



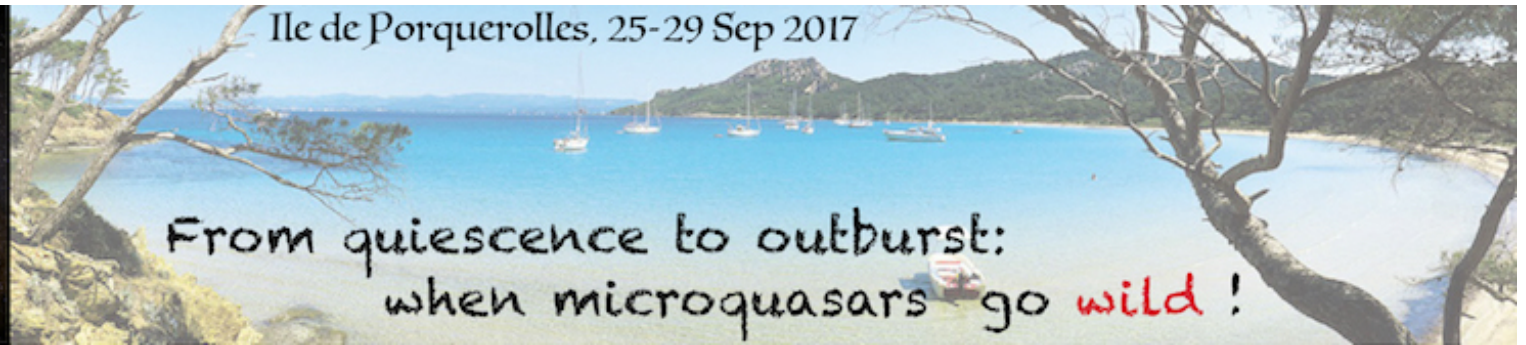
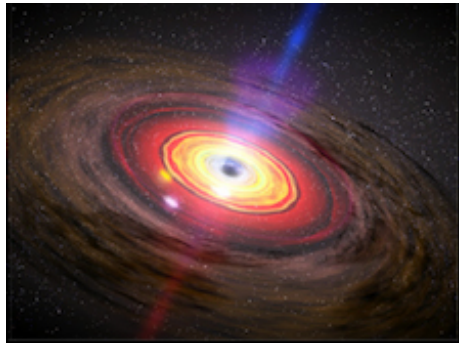
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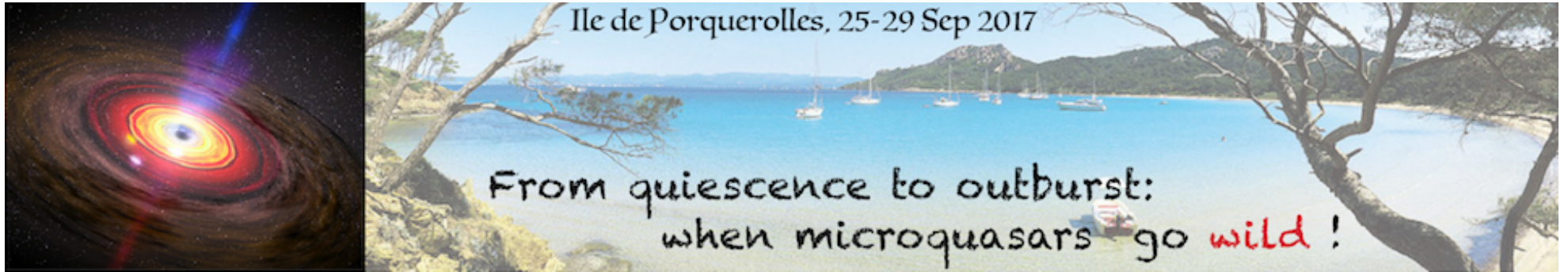
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Opt/Radio [SKA] might help, but different selection function?
- Lack of >10 keV coverage will *hurt* Reflection, turn over, hard tails – while at the same time radio coverage will be finally perfect!
- Fe-line detection is *not* detection of reflection!

Open Questions: Microquasar Workshop



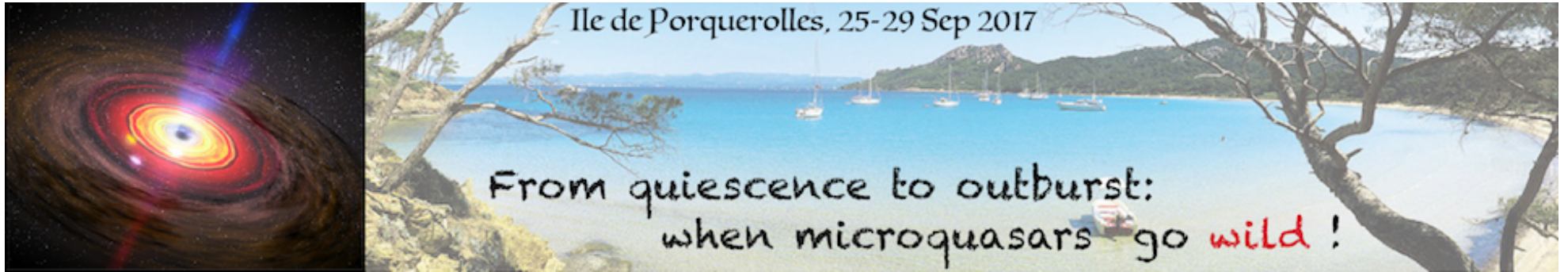
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let's not wait again for 9 years!

Open Questions: Microquasar Workshop



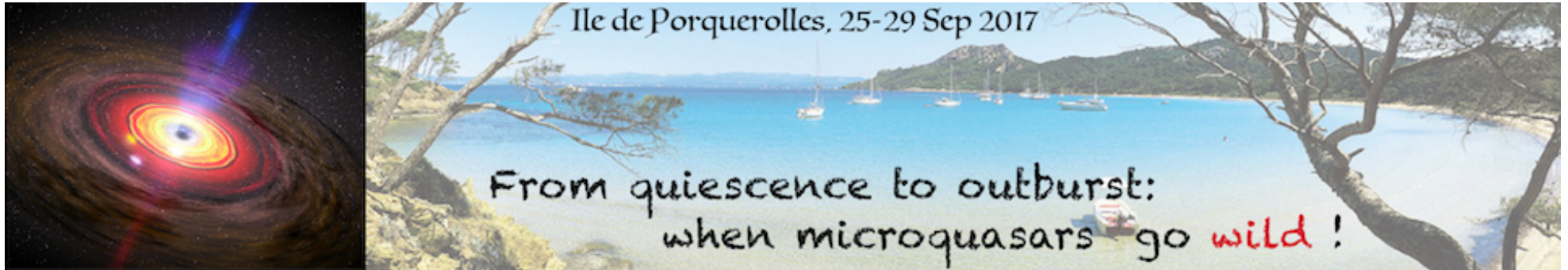
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Open Questions: Microquasar Workshop



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- **Will Emrah find more interesting things in his thesis?**

Open Questions: Microquasar Workshop



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let's not wait again for 9 years!
- Will the next meeting have **thermally insulated coffee cups** rather than plastic ones?
- Will Emrah find more interesting things in his thesis?
- What are the questions we need to solve until the next meeting?



Thanks to everybody for a great week!