Concluding remarks

Jelle Kaastra

Spectroscopy

- High-resolution X-ray spectroscopy: hardly can find any other more important topic in astrophysics…
- Below just some highlights: many other interesting contributions

Fluorescence

- Not many cases shown @ this meeting
- Cool material around T Tauri stars (Manuel Güdel)
- Field will revive if we get the first flying calorimeters

Triplet diagnostics & radiation fields

- Triplet ratio's sensitive to density and radiation field
- Can be used to determine distance gas (Ton Raassen, Jürgen Schmitt)
- Density evolution in stellar flares (Manuel Güdel)
- Presence of accretion disks (idem)

Absorption/Emission measure distribution

- Tomer Holczer: AMD: shows power of this method; also allows to disentangle Galactic foreground from AGN outflow in MCG -6-30-15
- Jeremy Sanders: EMD: cool core clusters (by the way, this shows AGN-cluster connection)

Photoionised plasmas

- Susmita Chakravorty: importance of modeling relevant physics (SED, Z) factors needed for proper interpretation of photoinised outflows in AGN
- Elisa Costantini: mixed CIE/PIE in X-ray binaries?

Photoionised gas in AGN

- Where is it? Ionisation processes?
- Spectral imaging ➔ Dan Evans
- Spectral timing ➔ Katrien Steenbrugge
- Long term monitoring ➔Rob Detmers

Relativistic lines ⇐⇒ ionised absorbers ⇐⇒ partial covering

- Talks by Andy Young, Jane Turner, Lance Miller: complicated spectra/timing structure
- This will keep us busy for quite some time
- Will IXO be able to answer this question?

Broad lines in AGN

- Not the relativistic ones, but still quite broad
- Where are these lines (not only Fe, but also O, etc.)? Torus? BLR?
- Clues: Anna Lia Longinotti, Stefano Bianchi

Abundances

- Spectroscopy resolving the origin of a source: XB 1832-330: Ne/O=0.17➔ no Ne overabundance, no evidence for Ne-rich donor (Lara Sidoli)
- Altair: Ne/O=0.20+/-0.05, similar to Sun, so not consistent with Drake & Testa (Jürgen Schmitt)
- p.m.: what is “Solar” (I get 0.26+/-0.02 towards Crab, using RGS, Kaastra et al. 2009)
- Cr/Mn in SNR (Vink)

ISM

- 4U 1820-30, 4 HETGS epochs, no significant variability absorbing gas; all points to solely hot ISM origin, not intrinsic to source (Ed Cackett)
- O VII etc @ z=0: is it WHIM, Local Group or Galactic halo? (Rick Williams)

Shocks etc

(etc = interesting!)

- Colliding winds, need for IXO (Andy Pollock)
- Equilibration in shocks (Jacco Vink)
- NEI effects in SNR (Dasha Kosenko)
- Importance of spectral imaging (Dan Dewey)
- Importance of monitoring (Frank Haberl)
- Calibration (Paul Plucinsky)

(Very) complex source spectra

- Nova V2491 Cyg: what do we see? (Jan-Uwe Ness)

Planetary nebulae

- Beautiful results with LETGS (Young Sam Yu, Ehud Behar)
- Shows power of spectroscopy: abundances, T-measurement through RRCs

Comet physics

- RGS data challenge: extended, moving object; background from “HDF” (Konrad Dennerl)

Statistics

- Publication bias!!! There are hundreds of “hidden trials” (Phil Uttley)

New Instrumentation

- Talks by Nicastro, Parmar, Mitsuda, Ohashi, den Herder
- We really need those, but:
- We have not yet used the full potential of current instruments: bomb Norbert & Harvey with good spectroscopy proposals!

Atomic physics

- Good tools available, but still lot to improve till Astro-H & IXO (e.g., Randall Smith)
- Use these tools (e.g., www.sron.nl/spex)

Nobel prizes waiting for you…

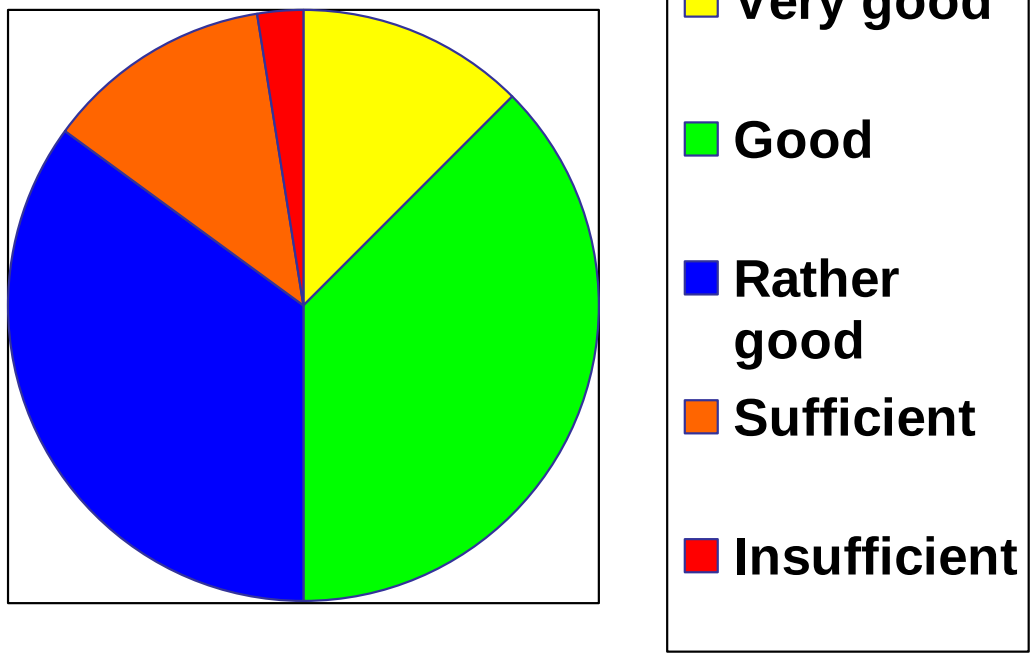
- Axions (Doron Chelouche)

What does this mean?

- *Sacrify graduate students* (Randall Smith)
- *Not much fame in this business* (idem)
- *You are not supposed to publish this* …(idem)
- *you can look until you drop and do not find periodicity for some sources* (Frank Verbunt)
- *δ Ori: it is there up above the pub* (Andy Pollock)
- "*I am a cheese-plate in between*" (Dan Dewey)
- "*I even can fit the light-curve with a blackbody*" (Jan-Uwe Ness)

Quality of talks

You all did a wonderful job! (knowing my critical mind…)



See you all next year!

- High-resolution X-ray spectroscopy: past, present and future
- Utrecht, Netherlands
- March 15-17, 2010
- See www.sron.nl/xray2010