

# Standard Candles: Report from the IACHEC Iceland Meeting 2006

Chair: Frank Haberl, borrowing heavily from his report

## ➤ Definition of a Standard Candle

Sources with constant (*hopefully*) X-ray flux: white dwarfs

isolated neutron stars

supernova remnants

cluster of galaxies

## ➤ Science drivers for absolute flux calibration

- neutron star radii

- cosmology (total mass of galaxy clusters, Sunyaev Zeldovich effect)

- SNRs (total mass of ejected material)

## ➤ Calibration purposes

- absolute flux calibration *and*

- energy scale, energy resolution, redistribution function

## ➤ Regular monitoring of SCs is essential for tracking temporal changes

# Suggested Standard Candles (presented by Haberl in Iceland)

White dwarfs	HZ43	Sirius B	GD153
Neutron stars	RXJ1856	PSR0656	
Supernova remnants	1E0102	N132D	Cas-A
non-thermal SNRs	Crab	G21.5	(3C58 5'x8')
	PSR1509	0540-69	
Cluster of galaxies	To be defined: bright, small, simple		

we should agree on candidate clusters at this meeting

## Celestial Sources: Usage by Current Missions

XMM	:	RXJ1856 1E0102		Crab		N132D	GD153
Chandra	:	RXJ1856 1E0102	Cas A			G21.5	
Suzaku	:	RXJ1856 1E0102	Cas A	Crab			
RXTE	:		Cas A	Crab			
Swift	:	RXJ1856 1E0102	Cas A	Crab			
Integral	:		Cas A	Crab			

- Is the Crab too bright for the low energy X-ray missions ?
- Should the current missions be looking at fainter sources in anticipation of future missions with much larger collecting areas ?
- Should future missions have ``grey'' filters so that they can observe these sources ?

### ``Laboratory'' Absolute Standards

- dedicated calibration mission, measure absolute flux from Crab ?
- new X-ray sources for in-light calibration

## Goals for this Meeting

- Review sources used for cross-calibration by the various missions, do we want to add or delete any sources ?
- Review results from the cross-calibration observations which have been observed
- Agree on models and parameters for the standard candles, E0102, RXJ1856, and the Crab appear to be the closest to this goal
- Post models on IACHEC web page
- Include statistical errors ? Define confidence limits for parameters ?
- Include differences between the various instruments ?