

XTP-GRAVITAS WORKSHOP summary

26th - 27th June, 2013 Beijing

1. PURPOSE OF THE WORKSHOP

The Chinese Academy of Sciences (CAS) has started to develop a future X-ray astronomy mission, called X-ray Timing and Polarization (XTP) mission. XTP is now funded for key technology demonstration and mission definition study. In the mean time, an X-ray astronomy mission called Gravitas has been proposed in Europe. After several discussions between CAS and MPE scientists, it is realized that XTP and Gravitas have quite good synergy, in terms their scientific goals and mission concepts. Therefore CAS and the Max Planck Society have set up a joint working group in October 2012 to explore the opportunity to merge XTP and Gravitas into a joint China-Europe X-ray mission for a launch around 2020.

The objectives of this workshop are the optimization of the XTP scientific objectives and the XTP mission definition, as well as the possible scenarios to merge XTP and GRAVITAS and other possible international collaborations on the XTP mission.

2. MAIN ISSUES

scientific objectives

The participating astronomers have presented the XTP scientific objectives in general and in detail, the GRAVITAS scientific objectives, Athena status and the merged sciences.

The main problems in modern physics, which are also the main interest of XTP, are:

1. -One singularity (Black Hole)
2. -Two compact stars (Neutron Star, Quark Star)
3. -Three extremes (gravity, density and magnetism)

The major differences between XTP and GRAVITAS are the collimating payload and polarimetry. The advantages and disadvantages of collimating payload and focusing payload were listed and debated. The polarimetry science was deeply discussed. The workshop agreed that the driving scientific questions for XTP/GRAVITAS merged mission will be:

1. AGN spectral-timing/strong gravity (bright)
2. AGN spectra (faint)
3. Binary spectral-timing
4. Binary QPOs
5. Polarimetry

The effective area of focusing telescope has been confirmed to be the breakthrough capability of the merged mission. The unique polarization measurement capability has been selected as the distinguishing feature. XTP will open a new window using its powerful capability of polarization observation.

The workshop decided to set up an international science workgroup to lead the study on various science issues.

payload configuration, payload technologies and platform

Both XTP group and GRAVITAS group presented the payload design respectively, mainly focused on the X-ray optical technology and X-ray polarimeter.

The scheme of small-area telescope array on fixed optical bench has been chosen instead of deployable large-area telescopes.

The soft X-ray polarimetry instrument has been decided to be employed together with pixellated focal plane detector and hard X-ray optics.

To reach an agreed payload configuration in detail, the workshop decided to set up an international science workgroup to lead the study on various payload issues.

3. CONCLUSION

An effective area of $\sim 1 \text{ m}^2$ at the iron line for focusing telescopes has to be achieved in the merged mission of XTP and GRAVITAS.

Both sides decide to pursue studies on the scientific issues and payload design. Several international workgroups are to be set up to conduct them.

Both sides agreed to enhance the collaboration not only in mission level, but also in the level of instrument technologies.