[ID-11] Design of CQUEAN (CCD Camera for QUasar in Early uNivers)

Eunbin Kim[1], Heeyoung Oh[1], Huynh Anh Le Nguyen[1], Soojong Pak[1] and Myungshin Im[2]
[1]*Departmen of Astronomy and Space and Science, Kyung Hee University*
[2]*Center for the Exploration of the Origin of the Universe (CEOU), Department of Physics and Astronomy, Seoul National University*

We are developing CCD camera, CQUEAN (Camera for QUasar in Early uNivers), that can detect Y-band (λ=1.005m) for observing quasars at $z > 7$ in the early universe. The detector consists of two HPK 2k × 4k CCD with a pixel size of 15 m. The thick back illuminated CCD is fabricated on high resistivity silicon. The advantages of the device are its thicker depletion layer, which improves the QE(40% at Y-band) and the absence of interference fringing.

The camera will be placed on the McDonald 2.1m telescope (Otto Struve telescope) of the University of Texas at Austin. With the telescope diameter of 2.08m (82inch) and F/13.7, the pixel scale will be 0.11 arcsec/pix and the CCD FOV is 7.4 × 7.4 arcmin. In this presentation, we will show the conceptual design for CQUEAN and thermal analysis for the cryostat. We willuse controller electronics from ARS, Astronomical Research Camera, Inc., and the control software will be developed on the Linux platform. We plan to see the first light by the end of 2010.

[ID-12] Development of tantalum based superconducting tunnel junctions

Ho Seop Yoon[1,2,3], Young-Sik Park[2], Jang-Hyun Park[2], Min Kyu Yang[3], Jeon Kook Lee[3],
Yonuk Chong[4], Yong-Ho Lee[4], Sang-Kil Lee[4], Dong-Lak Kim[5], Sug-Whan Kim[1]
[1]*GSOL, Dept. of Astronomy of Space Science, Yonsei Universityty,*
[2]*Korea Astronomy and Space Science Institute(KASI)*
[3]*Korea Institute of Science and Technology(KIST)*
[4]*Korea Research Institute of Standards and Science(KRISS)*
[5]*Korea Basic Scienve Institute(KBSI)*

We report the successful fabrication and I-V curve superconductivity test results of the Ta-based superconducting tunnel junctions(STJ). STJ device is a candidate detector for next-generation astronomy. Because it is capable of counting photons from X-ray to NIR while exhibiting a high quantum efficiency, a high temporal response and an energy resolution much better than that of semiconductor-based devices. STJ with side-lengths of 20, 40, 60 and 80 μm were fabricated by deposition of Ta/Al/AlOx/Al/Ta 5-layer thin films incorporated on a 2-inch silicon wafer. These STJ thin-films were fabricated using UV photo-lithography, DC magnetron sputtering, reactive ion etching(RIE), and chemical vapor deposition(CVD) techniques. I-V curve superconducting state test for STJ was succeeded in 4K with liquid helium cooling system. Their performance indicators such as energy gap, normal resistance, normal resistivity, dynamic resistance, dynamic resistivity, and quality factor were measured from I-V curve. The STJ material analysis results obtained from x-ray diffraction(XRD) and scanning electron microscope(SEM) are also presented.