X-RAY OBSERVATIONS OF NEUTRON STARS AND PULSARS: RECENT RESULTS FROM XMM-NEWTON

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The X-ray Multi-Mirror Mission XMM-Newton is ESA's largest observatory so far; it is dedicated to explore the Universe in the 0.2 - 15 keV X-ray band of the electromagnetic spectrum. Because of its large collecting area very faint sources not accessible before can be observed and it is therefore the long awaited instrument to study young pulsars and neutron stars in supernova remnants, cooling neutron stars and millisecond pulsars at X-ray energies.

The high throughput of the instruments, which all are operated simultaneously, provide high resolution spectral, spatial and temporal information from a source during a single observation and make XMM-Newton unique and best suited for pulsar studies. In the talk we will briefly describe the instrument capabilities useful for pulsar observations and provide information on the timing accuracy on the relative and absolute scale. We further report on observations of the Crab-pulsar, PSR J1617-5055 near RCW 103, of young neutron stars in the supernova remnants RX J0852-4622, Puppis-A and RCW 103 (including 1E161348-5055.1 which is identified to be the first binary in a supernova remnant), of the cooling neutron star PSR B1055-52 and on the millisecond pulsar PSR J0030+0451 which all were observed by XMM-Newton during the first two years of scientific operation.