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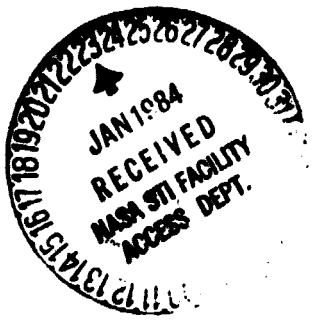
FINAL TECHNICAL STATUS REPORT

NASA Grant Number NAG8-446

"Studies of Highly Variable Galactic X-ray Sources with HEAO-1"



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October 31, 1983

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C Tucker for
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Dr. Buford Price
Principal Investigator

"Studies of Highly Variable Galactic X-ray Sources with HEAO-1"

Final Technical Report

Following the submission of the semi-annual status report, I returned to NRL in May and continued analyzing HEAO-A1 data on MXB1659-29. During this trip, I discovered a 7.1 hour period from this X-ray burst source (in collaboration with K. S. Wood). The attached IAU circular was sent out after the 7.1 h period was discovered; the erratic dips seen in both SAS-3 and HEAO-A1 data were concentrated within 1.5 hours (about 25%) of the orbital cycle. In addition, there appeared to be a "stable" dip at the end of the 1.5 h of erratic variability.

I continued working on the NRL data remotely from my computer terminal in Berkeley; the printer I obtained with this grant was invaluable to these efforts during the next 3 months. During this time, I established that the "stable" dip was a true eclipse of the central X-ray emitting object. MXB1659-29 is the first X-ray burster to show eclipses and a precise orbital clock. The eclipse discovery was presented in a talk I delivered at the Sixth Annual Santa Cruz Summer Workshop in Astronomy and Astrophysics. The talk generated a lot of excitement at this special workshop which was devoted to High Energy Transients (X-ray and γ-ray Bursters). A copy of the paper that will appear in the proceedings is attached.

At the end of September, I submitted the enclosed lengthy paper to the Astrophysical Journal. I am currently awaiting the referee's report before sending out preprints. I have applied for a continuation of this grant to address the remaining topics in my original proposal, and to write a follow-up paper on MXB1659-29.