

**Proposal for *Chandra* Observations**

**Cycle 10**

Cover Page

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<b>Proposal Title</b> Quantitative X-ray Spectral Modeling of the Canonical O Supergiant Wind-Shock Source zeta Puppis			
<b>Subject Category</b> STARS AND WD			
<b>Proposal Type</b> GO	<b>Linked Proposal</b> N	<b>Distr. Medium</b> WWW ONLY	<b>Proprietary Rights</b> S
<b>Total Requested Time</b> 210.00	<b>Number of Targets</b> 1		<b>Proposed Budget</b>

<b>Joint Proposal?</b>	
<b>HST Orbits</b>	<b>HST Instruments:</b>
<b>XMM Time</b>	<b>RXTE Time:</b>
<b>NOAO Nights?</b>	<b>NOAO Telescope/Instruments:</b>
<b>NRAO Hours</b>	<b>NRAO Telescopes</b>

<b>Abstract</b>		
<p>The X-ray bright O supergiant zeta Puppis has a 68 ks archival HETGS spectrum that is rich with diagnostic emission lines. The 210 ks observation we are proposing here will enable us, primarily by the quantitative modeling of the broad and asymmetric emission lines, to determine the properties of the shock-heated wind and to determine the relative roles of mass-loss rate reduction and large scale clumping. Not only will the proposed observation generate a spectrum that will be one of the most significant legacies of the Chandra gratings, but it will provide key information about the mass-loss rates of O stars, which will have a bearing on studies of the galactic ISM and the fates of evolved massive stars.</p>		
Proposal Number	Date: 2008-03-19	Admin. use only

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General Form

<b>PI</b> Prof. David H Cohen		
<b>Proposal Title</b> Quantitative X-ray Spectral Modeling of the Canonical O Supergiant Wind-Shock Source zeta Puppis		
<b>Co-Investigator(s)</b>		
<b>First Name Last Name</b>	<b>E-Mail Institute</b>	<b>Country</b>
Maurice Leutenegger	maurice@milkyway.gsfc.nasa.gov NASA/GSFC	USA
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Stan Owocki	owocki@bartol.udel.edu UNIVERSITY OF DELAWARE	USA
Are there additional Co-Is listed in the science justification? <input type="checkbox"/> N		
Is the first Co-I doing observing, rather than the PI? <input type="checkbox"/> N    Telephone:		

**Institute Endorsement**

<b>Name of Administrator</b>	Constance Hungerford
<b>Administrative Authority</b>	Provost
<b>Administrative Institute</b>	Swarthmore College
<b>Admin Signature:</b>	<b>Date:</b>
<b>PI Signature:</b>	<b>Date:</b>

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Target Summary

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Tar No	Target Name	(J2000)	Offsets		Optical Monitor	Observ. Time (ksec)	Detector	(c/s) Count Rate	Time-Constr?	Grid #Points
	Solar System Object		Y Detector	Z Detector			Grating			
	Grid Name		R.A.	SIM Trans			HRC			
	Target Description (keywords)		Dec.	V-Mag			Timing			
	1st Order	Ext.Src?	Total Fld.	MaxDist.						
1	zeta Pup NONE  MASSIVE STARS; WINDS/OUTFLOWS/MASS-LOSS	08 03 35.0 -40 00 11.3			N	210.000	ACIS-S HETG N	1.000000 0.400000 2.000000	N N	N

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ACIS Parameters (Required, Pileup, Telemetry Parameters)

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Tar No.	Exposure Mode	CCDs On						Most Eff.	Subarray		Alternating Exposures		Energy Filter		Spectra	
	Telemetry. Format	I0	I1	I2	I3			StartRow	Nbr. Rows	Y/N	Exp.Time	Lower Thresh.	Max Count	Mult. Lines		
		S0	S1	S2	S3	S4	S5	CCD Time	Type	No.Rows		Y/N	Range			
1	TE F		N	N	N	N		Y	NONE			N				
		Y	Y	Y	Y	Y	Y									

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ACIS Parameters (Custom:Telemetry Overflow Parameters)

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Tar No	Or-der	Chip	Type	Spatial Windows							Additional Spatial Windows
				Start Row	Start Col	Width	Height	Lower Threshold	Energy Range	Sample Rate	

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Target Constraints

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Tar No	Window Constraint			Roll Constraints			Phase Dependent Observations			
	Flag	Start Time	Stop Time	Flag 180?	Angle (degrees)	Tolerance (degrees)	Flag	Epoch(MJD) Period(days)	Min.Phase Min.Error	Max.Phase Max.Error

Tar No	Monitoring Observations				Group Observations			Un-interrupt?	Coordinated		Add. Constraints
	Flag No.	Geometric Factor	Interval (days)	Tolerance (%)	Flag	Group ID	Interval (days)		Flag	Interval (days)	

TOO Details

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Tar No	Trig-ger?	Alternates		Response Window			Prob-ability	Initial Alloc.	Followup Observations				Obs.Params specified by Target No.
		Group Name	Nbr. Req.	Type (days)	Start	Stop			Order	Time	Interval (days)	Tolerance (%)	
									1				
									2				
									3				
									4				
									5				
									6				
									7				
									8				

TOO Trigger Criteria

TOO Followup Instructions

If this TOO is a resubmission of a proposal approved in the previous Cycle, should this TOO be canceled if the previous Cycle TOO is triggered?

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Target Remarks

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Tar No	Remarks
	Coordinated Observation: Observatories