W. M. Keck Observatory
Proposal Cover Sheet 2024B_U227

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PI Contact Information

Title:	Professor
FirstName:	Jessica
MiddleName:	
LastName:	Lu
Email:	jlu.astro@berkeley.edu
Phone:	310-709-0471
Address:	501 Campbell Hall #3411
	Berkeley, CA 94720-3411
AllocInst:	UCB
Category:	Faculty/Professional Staff

Collaborators

Category	FirstName	MiddleName	LastName	Email
PostDoc	Casey		Lam	casey_lam@berkeley.edu
Faculty/Professional Staff	William		Dawson	dawson29@llnl.gov
Faculty/Professional Staff	Peter		Nugent	penugent@lbl.gov
Faculty/Professional Staff	David		Bennett	bennett.moa@gmail.com
PostDoc	Sean		Terry	sean.terry@berkeley.edu
Graduate Student	Natasha		Abrams	nsabrams@berkeley.edu
Faculty/Professional Staff	Howard		Isaacson	hisaacson@berkeley.edu
PostDoc	Macy		Huston	mhuston@berkeley.edu
PostDoc	Charles-Antoine		Claveau	caclav@berkeley.edu

Program Information

Type:	Cadence
Title:	Finding Isolated Black Holes with Astrometric Microlensing
Summary:	Our Galaxy most likely hosts 10^8-10^9 stellar mass black holes. The exact number and mass function of these black holes contains important information regarding our Galaxy's star formation history, stellar mass function, and the fate of very massive stars. However, isolated stellar black holes have yet to be detected. We propose to use microlensing events as a means of finding isolated black holes and measuring their masses. We will select long-duration events from photometric microlensing surveys and use Keck OSIRIS LGS-AO to astrometrically monitor the system. We will search for deviations from linear motion of the lensed source to derive the mass of the lens and determine if it is a black hole.
NightsToComplete:	2
ProprietaryPeriod:	18

PPJustification:	
SpecialRequests:	Some of our targets have fainter tip-tilt stars (R=17), thus we impose a 30 deg moon avoidance limit. Dates to avoid due to moon: August 14-17, September 10-14 The bulge is visible in the first quarter of the night in August and September. We request that the 1.5 nights be scheduled as quarter nights centered on the Galactic bulge, with 0.75 nights in August and 0.75 nights in September to maximize the time baseline. We can easily share nights with other AO astrometry programs; particularly those conducting large surveys. Note, we cannot easily share with Galactic Center programs as we point to the same sky position. We prefer using OSIRIS for all requested nights, but will be able to use NIRC2 for our observations as well if necessary.

Cadence Proposal Information

Twilight Observing?:	No

Instrument	Date	Range	Time Requested	Part of Night	No. of Cons. Nights
OSIRIS-LGS	2024-08-01	10 days	1/4 night	Q1	3
OSIRIS-LGS	2024-09-01	5 days	1/4 night	Q1	3

Instrument Request Summary		
Instrument	No. of Runs	Total Time
OSIRIS-LGS	2	1.5 nights

Priority Coordinates

Target	RA	DEC	Epoch	Priority
Bulge	18:00:00.00	-30:00:00.00	2000	1