



13814 - The rise of an ionized outflow in the X-ray and UV spectra of the NLS1 Mrk 335

Cycle: 22, Proposal Category: GO
(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) MRK-335	COS/FUV	3	17-Jul-2014 21:07:42.0	yes
02	(1) MRK-335	COS/FUV	3	17-Jul-2014 21:07:44.0	yes

6 Total Orbits Used

ABSTRACT

We propose to obtain contemporaneous high resolution spectroscopy of the Narrow Line Seyfert 1 Galaxy Mrk 335 with triggered XMM-Newton/RGS (130 ks) and HST/COS (7 orbits) observations with the aim of studying the properties of the ionized outflow that has recently been discovered in archival data. XMM/RGS spectra obtained during an intermediate flux state (June 2009) revealed the presence of multi-component ionized gas outflowing at ~ 5000 km/s. In HST/COS data taken a few months later (Oct 2009-Feb 2010) we found evidence for smooth, broad and weak CIV absorption. The global behavior of the gas in both bands can be explained by variation of the covering factor and/or column density, possibly due to transverse motion of absorbing clouds at Broad Line Region scale.

OBSERVING DESCRIPTION

For HST, we request a non-disruptive ToO that we will trigger at the same time as XMM. This will ensure that within 2.5 weeks from the trigger we will observe the source both in X-ray and UV. This time scale works very well with our prior results (Longinotti et al. 2013, ApJ, 766, 104) that suggest that the absorber in the UV is persistent on a time scale of weeks/months. During XMM-A013, Mrk 335 has two XMM visibility windows of about 6 weeks in the period June-July and December-January, fully compatible with visibility for HST, which runs from May 18 through February 10. To obtain HST/COS spectra of Mrk 335 using gratings G130M and G160M, comparable to those in Longinotti et al. 2013, requires 2 orbits. For gratings G130M and G160M, we use three central wavelength settings and multiple FP-POS positions to bridge the gap between detector segments, and to avoid detector and flat-field artifacts. In addition, we will use grating G140L/1280 with four FP-POS positions to measure absorption in OVI 1034 and Ly β . At the historical mean flux level of 5.6×10^{-14} erg cm $^{-2}$ s $^{-1}$ A $^{-1}$ at 1390 A (Dunn et al. 2006, PASP, 118, 572), using the on-line COS ETC shows that in the additional 4 orbits from our allocation (9320 s exposure time) we obtain a S/N of 17.5 in the continuum, comparable to the M-grating exposures described in Longinotti et al. 2013. We will organize our observation as two visits: The first will use 2 orbits for G130M and G160M, and one additional orbit for G140L; the second visit will use 3 more orbits of just G140L. Both visits should be spaced as closely in time as possible.

To allow for the range of variability observed in Mrk 335, we have chosen BUFFER TIMES significantly shorter than the 2/3 factor recommended in the ETC. We have also chosen the BUFFER TIMES to be integer multiples of (exposure time - 110 s) to minimize the overheads due to buffer readouts between successive exposures.

These observations pose no bright object concerns. All historical flux levels for Mrk 335 lie below the bright object limits for COS. Since Mrk 335 has been observed successfully before, there are also no surrounding field objects that are too bright. This is confirmed by the BOT tool for GALEX in APT.

Proposal 13814 - Visit 01 - The rise of an ionized outflow in the X-ray and UV spectra of the NLS1 Mrk 335

Fri Jul 18 01:07:46 GMT 2014

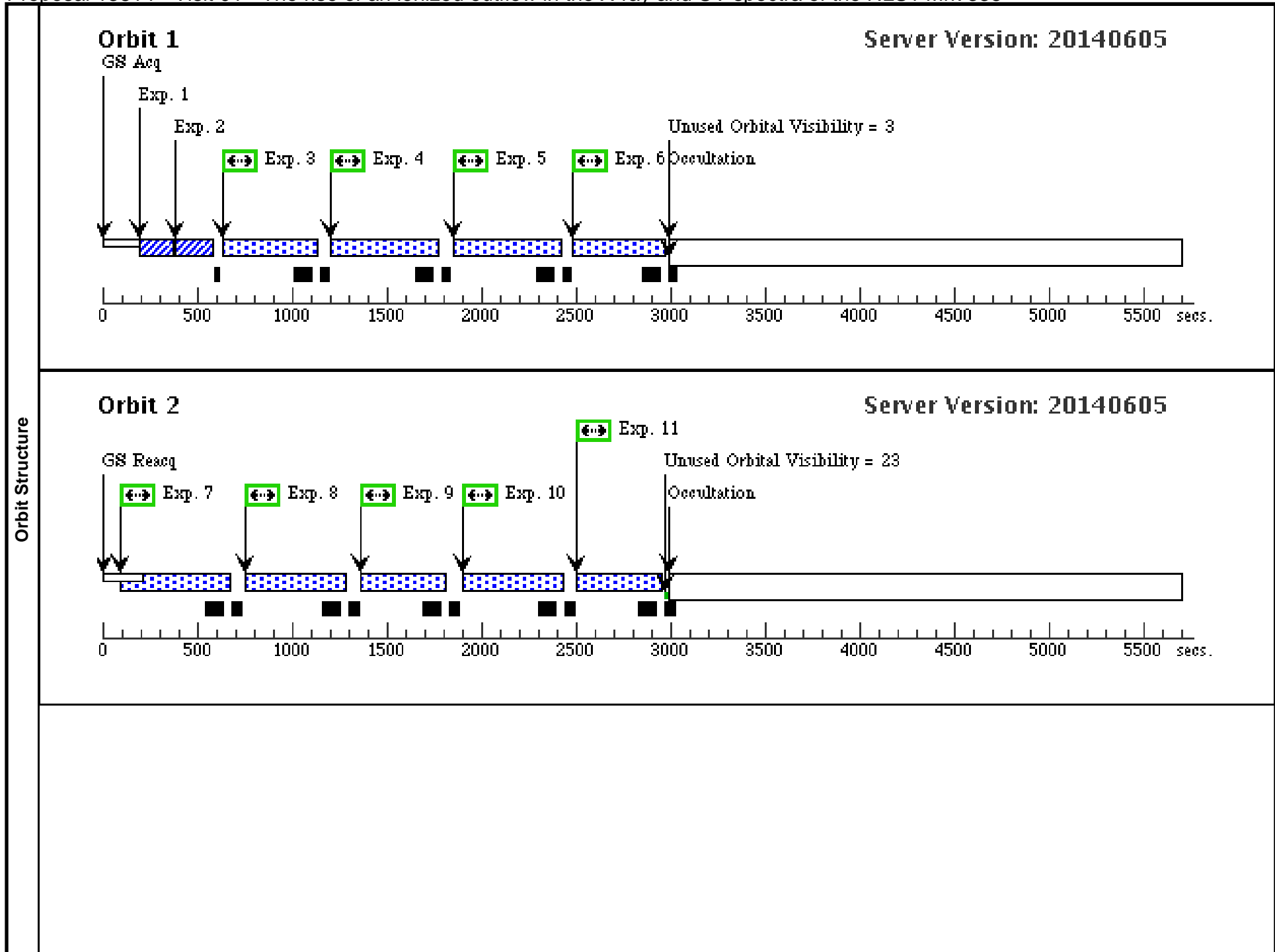
Visit	<p>Proposal 13814, Visit 01</p> <p>Diagnostic Status: Warning</p> <p>Scientific Instruments: COS/FUV</p> <p>Special Requirements: SCHED 100%; ON HOLD ; TOO RESPONSE TIME 15.0D</p> <p><i>Comments: Coordinate this first visit as close in time as possible after the ToO observation with XMM is triggered. For HST this should be a non-disruptive ToO, scheduled within ~2.5 weeks of the trigger. The second visit should follow the first as close in time as possible, but not more than 2-3 days later.</i></p> <p><i>On Hold Comments: Triggered by Swift; coordinated with XMM-Newton</i></p>					
	<p>(Visit 01) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting.</p>					
Diagnosics						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	MRK-335	RA: 00 06 19.5000 (1.5812500d) Dec: +20 12 10.00 (20.20278d) Equinox: J2000	Redshift: 0.025785	V=13.85 5.6e-14 at 1390 A	Reference Frame: ICRS
<p><i>Comments: Coordinates are copied from the prior successful GTO observation of this object in proposal 11524.</i></p>						

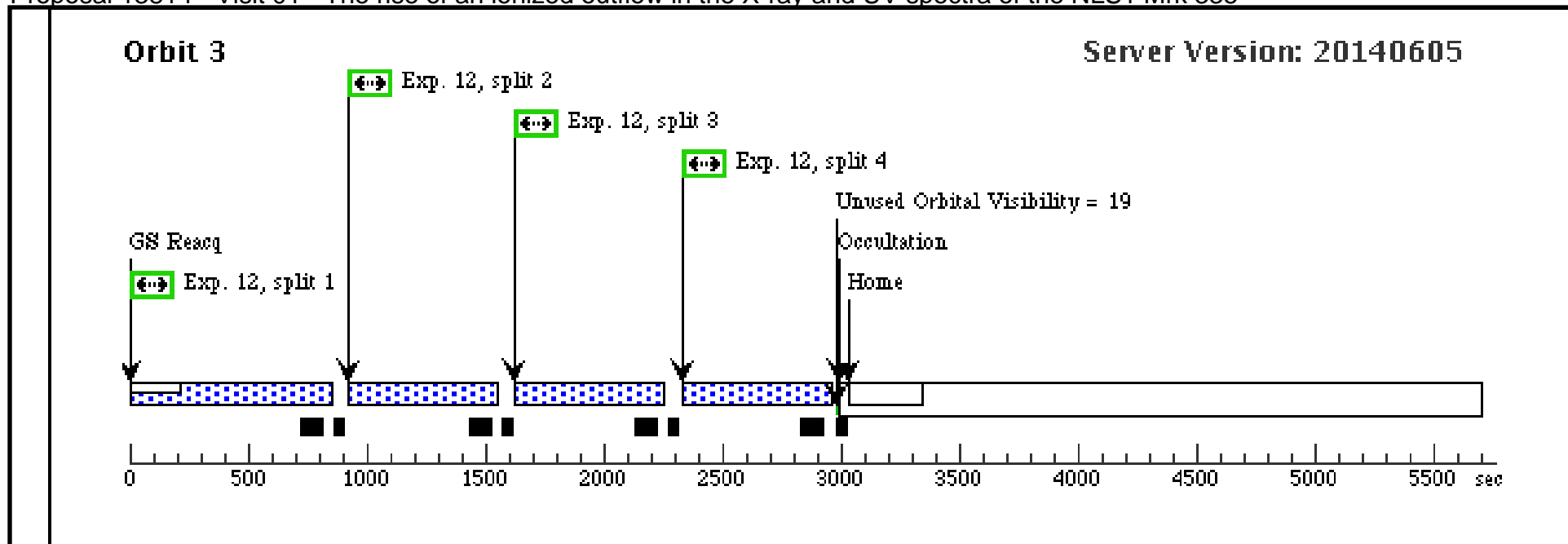
Proposal 13814 - Visit 01 - The rise of an ionized outflow in the X-ray and UV spectra of the NLS1 Mrk 335

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
Exposures	1	(COS.sa.618 (1) MRK-335 234)	COS/FUV, ACQ/PEAKXD, PSA	G130M 1291 A				9 Secs (9 Secs) [==>]	[1]	
	<i>Comments: Exposure time increased by about 4x from ETC to allow for source variability.</i>									
	2	(COS.sa.618 (1) MRK-335 234)	COS/FUV, ACQ/PEAKD, PSA	G130M 1291 A	NUM-POS=5; STEP-SIZE=0.9; CENTER=FLUX-W T-FLR			9 Secs (9 Secs) [==>]	[1]	
	<i>Comments: Exposure time increased by about 4x from ETC to allow for source variability.</i>									
	3	(COS.sp.618 (1) MRK-335 218)	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=34 0; FP-POS=4			450 Secs (450 Secs) [==>]	[1]	
	<i>Comments: FP-POS=4 gives shortest wavelengths for G130M/1289. But, B->A segment gap falls in red wing of redshifted N V, so only want one exposure here. Buffer time reduced by more than 2/3 of the ETC value to allow for source variability. Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.</i>									
	4	(COS.sp.618 (1) MRK-335 218)	COS/FUV, TIME-TAG, PSA	G130M 1318 A	BUFFER-TIME=33 0; FP-POS=1			440 Secs (440 Secs) [==>]	[1]	
	<i>Comments: FP-POS=1 puts the B->A segment gap as far as possible to the red of redshifted N V, so only want one exposure here. Buffer time reduced by more than 2/3 of the ETC value to allow for source variability. Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.</i>									
	5	(COS.sp.618 (1) MRK-335 218)	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=33 0; FP-POS=3			440 Secs (440 Secs) [==>]	[1]	
<i>Comments: FP-POS=3 and 4 for 1327 avoids the gap from 1318/FP-POS=1. Buffer time reduced by more than 2/3 of the ETC value to allow for source variability. Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.</i>										
6	(COS.sp.618 (1) MRK-335 218)	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=33 0; FP-POS=4			440 Secs (440 Secs) [==>]	[1]		
<i>Comments: FP-POS=3 and 4 for 1327 avoids the gap from 1318/FP-POS=1. Buffer time reduced by more than 2/3 of the ETC value to allow for source variability. Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.</i>										
7	(COS.sp.618 (1) MRK-335 218)	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=29 0; FP-POS=1			400 Secs (400 Secs) [==>]	[2]		
<i>Comments: FP-POS=4 gives shortest wavelengths for G160M/1577. But, B->A segment gap falls in blue wing of redshifted C IV, so only want one exposure here. Buffer time reduced by more than 2/3 of the ETC value to allow for source variability. Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.</i>										
8	(COS.sp.618 (1) MRK-335 218)	COS/FUV, TIME-TAG, PSA	G160M 1611 A	BUFFER-TIME=29 0; FP-POS=3			400 Secs (400 Secs) [==>]	[2]		
<i>Comments: FP-POS=3 and 4 for 1611 puts the gap in the far red wing of redshifted C IV. Buffer time reduced by more than 2/3 of the ETC value to allow for source variability. Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.</i>										
9	(COS.sp.618 (1) MRK-335 218)	COS/FUV, TIME-TAG, PSA	G160M 1611 A	BUFFER-TIME=29 0; FP-POS=4			400 Secs (400 Secs) [==>]	[2]		
<i>Comments: FP-POS=3 and 4 for 1611 puts the gap in the far red wing of redshifted C IV. Buffer time reduced by more than 2/3 of the ETC value to allow for source variability. Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.</i>										

Proposal 13814 - Visit 01 - The rise of an ionized outflow in the X-ray and UV spectra of the NLS1 Mrk 335

10	(COS.sp.618 (1) MRK-335 218)	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=29 0; FP-POS=1	400 Secs (400 Secs) [==>]	[2]
<p><i>Comments: FP-POS=1 and 2 for 1623 covers the gap from 1611. Buffer time reduced by more than 2/3 of the ETC value to allow for source variability. Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.</i></p>						
11	(COS.sp.618 (1) MRK-335 218)	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=29 0; FP-POS=2	400 Secs (400 Secs) [==>]	[2]
<p><i>Comments: FP-POS=1 and 2 for 1623 covers the gap from 1611. Buffer time reduced by more than 2/3 of the ETC value to allow for source variability. Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.</i></p>						
12	(COS.sp.618 (1) MRK-335 218)	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=47 0; FP-POS=ALL	580 Secs (2320 Secs) [==>(Split 1)] [==>(Split 2)] [==>(Split 3)] [==>(Split 4)]	[3]
<p><i>Comments: Buffer time reduced by more than 2/3 of the ETC value to allow for source variability. Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.</i></p>						





Proposal 13814 - Visit 02 - The rise of an ionized outflow in the X-ray and UV spectra of the NLS1 Mrk 335

Fri Jul 18 01:07:47 GMT 2014

Visit	Proposal 13814, Visit 02 Diagnostic Status: Warning Scientific Instruments: COS/FUV Special Requirements: SCHED 100%; AFTER 01 BY 0 D TO 3 D; ON HOLD ; TOO RESPONSE TIME 15.0D Comments: This second visit should follow the first as close in time as possible, but not more than 2-3 days later. On Hold Comments: Triggered by Swift; coordinated with XMM-Newton																																																																																														
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