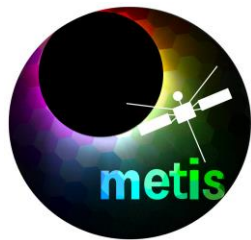




Scientific Observing Modes Science Activity Plan

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- Specific instrument observing modes have been defined in order to address the scientific objective of METIS investigation (see METIS-OACT-RPT-001)
- General METIS observations:
 - ✧ global maps of the coronal emission in UV H I Ly- α and VL (580-640 nm range)
 - ✧ different spatial resolution and detector exposure time, depending on the science goal and the instantaneous field of view (FoV).



METIS Observing Modes: STANDARD

	Mode	Electron density measurement and solar wind velocity	Slow wind source regions (magnetic topology)	Global corona configuration/ evolution during CME events	Long-term evolution of the coronal configuration
	Name	WIND	MAGTOP	GLOBAL	LT-CONFIG
	Science Sect.	3.1.1 – 3.1.2	3.1.4 – 3.1.5	3.3.1	3.3.2
	Global maps	- UV H I Ly- α emission - polarized VL in the range 580-640 nm			
	Spatial Plate Scale	20'' – 40''	20''	20'' – 40''	40''
	FoV (binning, pxl)	1.6 – 5 R $_{\odot}$ (2x2 \leq 2.5° 4x4 > 2.5°)	1.6 – 5 R $_{\odot}$ (2x2)	1.6 – 3.0 R $_{\odot}$ (@ 0.28 AU) (2x2 \leq 2.5° 4x4 > 2.5°) 5.1 – 9.8 R $_{\odot}$ (@ 0.9 AU) (2x2 \leq 2° 4x4 > 2°)	1.6 – 3.0 R $_{\odot}$ (@ 0.28 AU) (4x4) 5.1 – 9.8 R $_{\odot}$ (@ 0.9 AU) (4x4)
VLD	T _{ACO} = DIT	15 – 20 s	15 s	15 – 30 s	15 – 30 s
	T _{EXP}	75 – 450 s	75 – 300 s	75 – 450 s	300 – 450 s
	N _{POL}	4	4	4	4
	T _{CAD} ¹	5 – 30 min	5 – 20 min	5 – 30 min	20 – 30 min
UVD	DIT ²	1 – 60 s ³			
	T _{ACO}	1 – 600 s			
	T _{EXP}	5 – 30 min	5 – 20 min	5 – 30 min	20 – 30 min
	T _{CAD} ¹	5 – 30 min	5 – 20 min	5 – 30 min	20 – 30 min
	CR removal	YES	YES	YES	YES
	CME flag	ON	ON	ON	ON
	Data volume ⁴	12.01 Mb	19.83 Mb	12.01 – 8.06 Mb	4.99 – 4.99 Mb

¹ Time required to get a full set (4) of VL science images plus 1 UV science image.

² In Photon Counting Mode the typical DIT is 0.1 s.

³ Values valid in Analogue Mode only.

⁴ For a full set (4) of VL science images plus 1 UV science image (see Sect. 5.1.1).

Metis Observing Modes: SPECIAL

	Mode	Brightness fluctuations spectra		CME driven shocks and SEP (filamentary structure)	Mapping the emission of Sungrazing comets	Coordinated observations with Solar Probe Plus (SPP)
	Name	FLUCTS	TBF	CMEOBS	COMET	PROBE
	Science Sect.	3.1.3		3.2.1 - 3.3.1	3.4.1	3.3.1 – 3.3.2
	Global maps	- UV H I Ly- α emission - polarized VL in the range 580-640 nm				
VLD	Spatial Plate Scale	20''		20''	20''	20''
	FoV (binning, pxl)	1.6 – 3.0 R _☉ (@ 0.28 AU) (2x2) VL only		1.6 – 9 R _☉ VL (2x2) UV (1x1)	1.6 – 9 R _☉ VL (2x2) UV (1x1)	1.6 – 9 R _☉ (2x2) both VL and UV
	T _{ACQ} = DIT	1 s	20 s	15 s	15 – 20 s	15 – 30 s
	T _{EXP}	1 s	20 s	15 – 75 s	75 – 300 s	75 – 450 s
	N _{POL}	1	2 (same frame)	4	4	4
	T _{CAD} ¹	1 s	20 s	1 – 5 min	5 – 20 min	5 – 30 min
	DIT ²	1 – 60 s ³				
	T _{ACQ}	1 – 600 s				
	T _{EXP} ¹	---		1 – 5 min	5 – 20 min	5 – 30 min
	T _{CAD} ¹	---		1 – 5 min	5 – 20 min	5 – 30 min
UVD	CR removal	NO		NO if N _{ACQ} = 1 YES if N _{ACQ} > 1	YES	YES
	CME flag	OFF		OFF	ON	ON
	Data volume ⁴	4.67 Mb (VL)		23.34 Mb	23.34 Mb	19.85 Mb

¹ Time required to get a full set (4) of VL science images or 1 UV science image. In the case of the “FLUCTS” and TBF mode, to get 1 VL science image only.

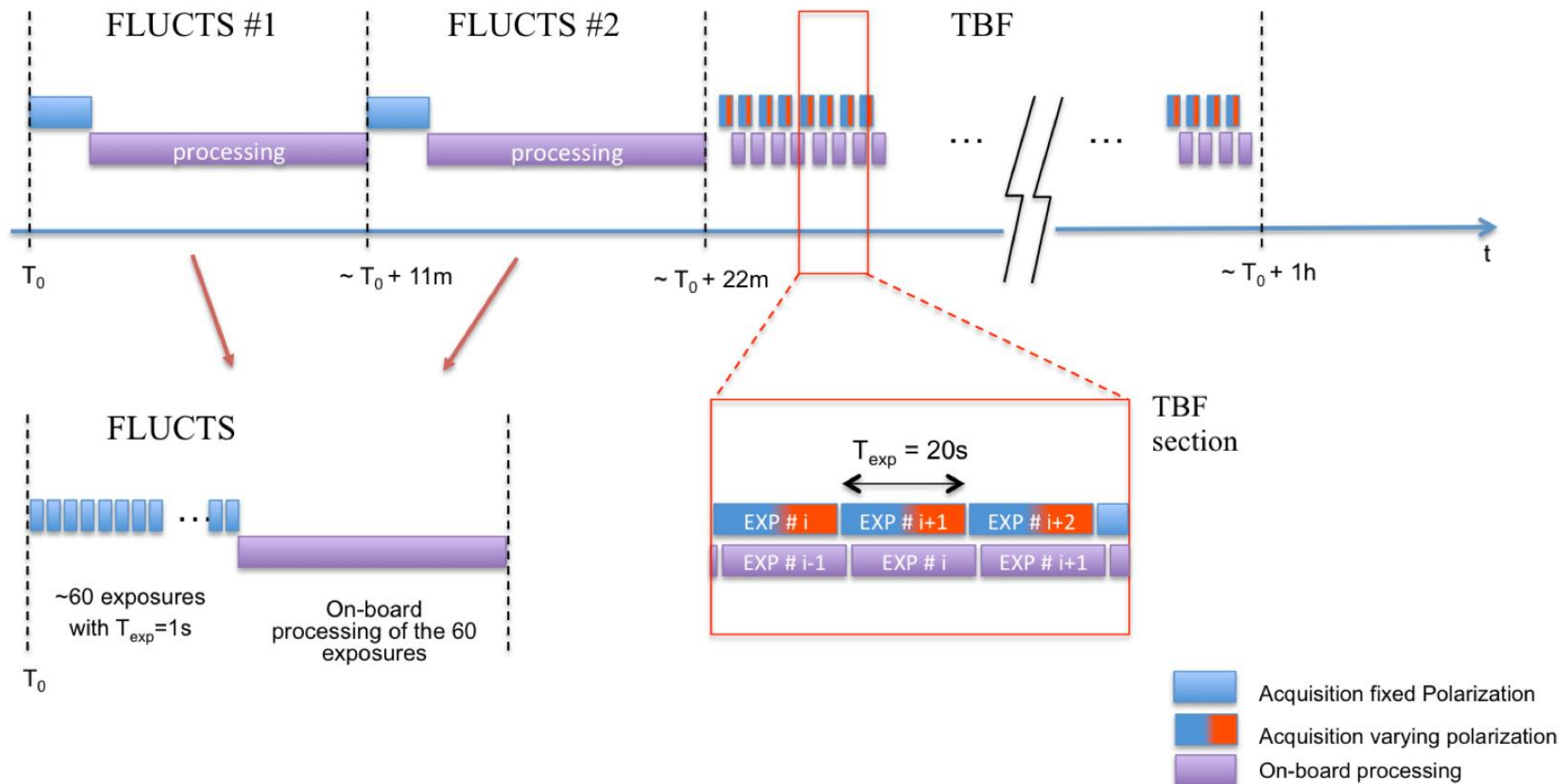
² In Photon Counting Mode the typical DIT is 0.1 s

³ Values valid in Analogue Mode only

⁴ For a full set (4) of VL science images plus 1 UV science image. In the case of the “FLUCTS” and “TBF” mode, 1 VL science image only (see Sect. 5.1.1).

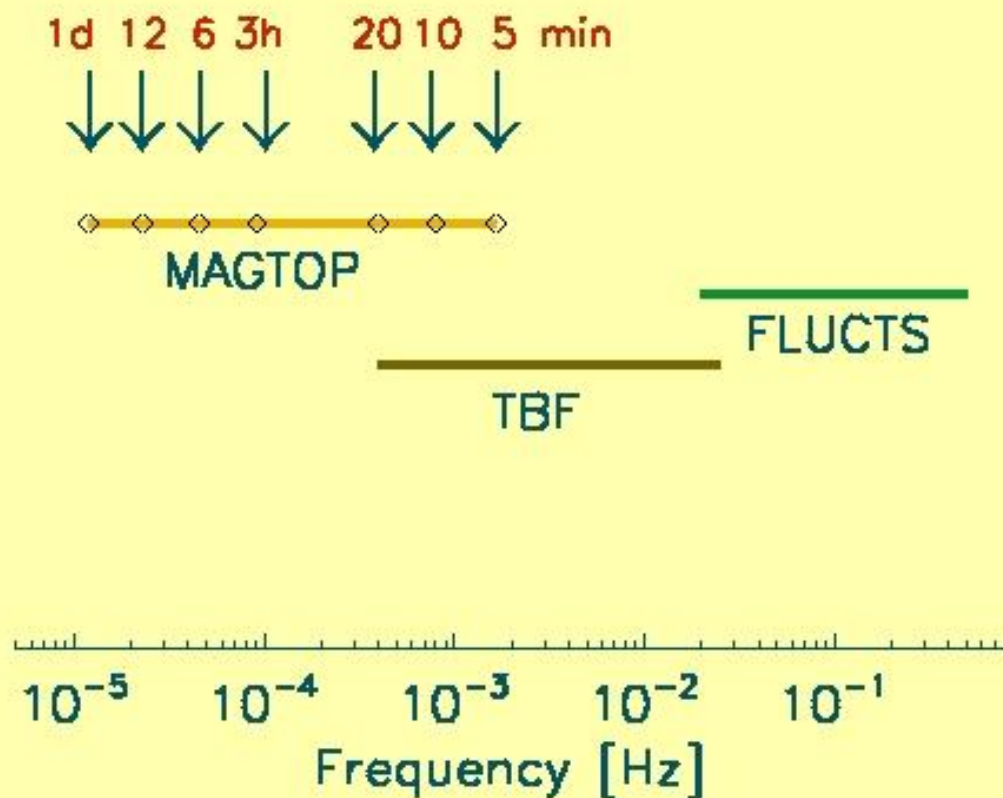


Timeline for the study of the high frequency brightness fluctuations spectra (duration ~ 1 hr)



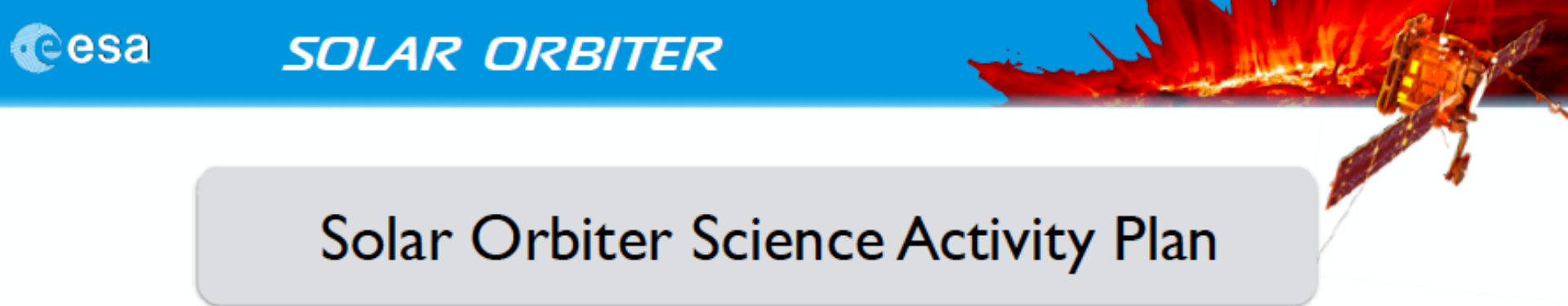


Minimum and maximum detectable frequencies depending on duration and cadence of obs





- **A revision of observing modes is in order:
also taking into account the discussions at the meeting,
the instrument calibration results and SW performance**
- **Observing modes will be the fundamental contribution
to the specific science activities constituting the
backbone of the Solar Orbiter Science Activity Plan**



Solar Orbiter Science Activity Plan

The Science Activity Plan (SAP) will describe in a structured way all scientific activities to be carried out by the instruments throughout the nominal phase in order to fulfill the Science Requirements of the mission.

