Report on early off-axis heating experiments

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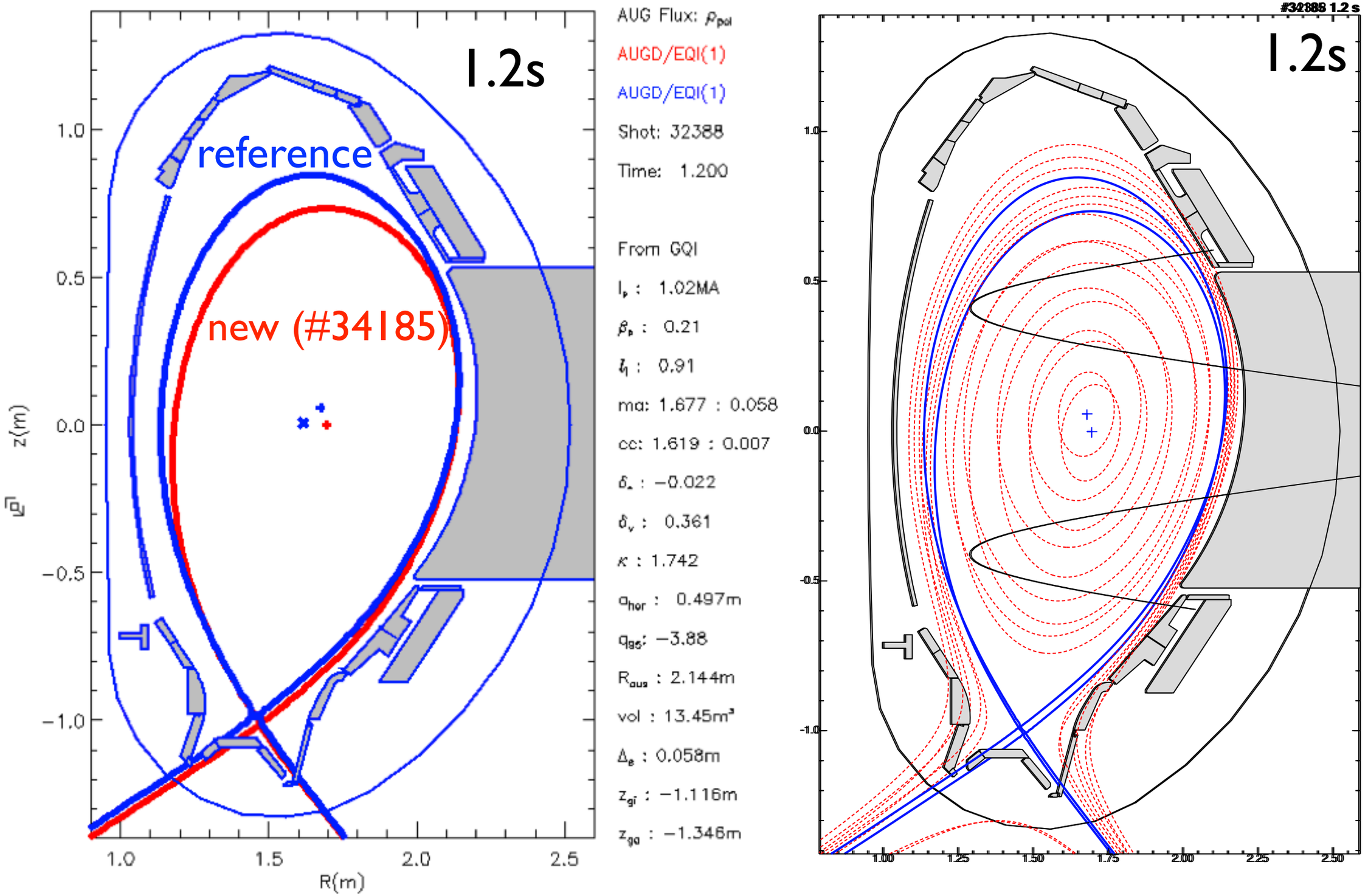
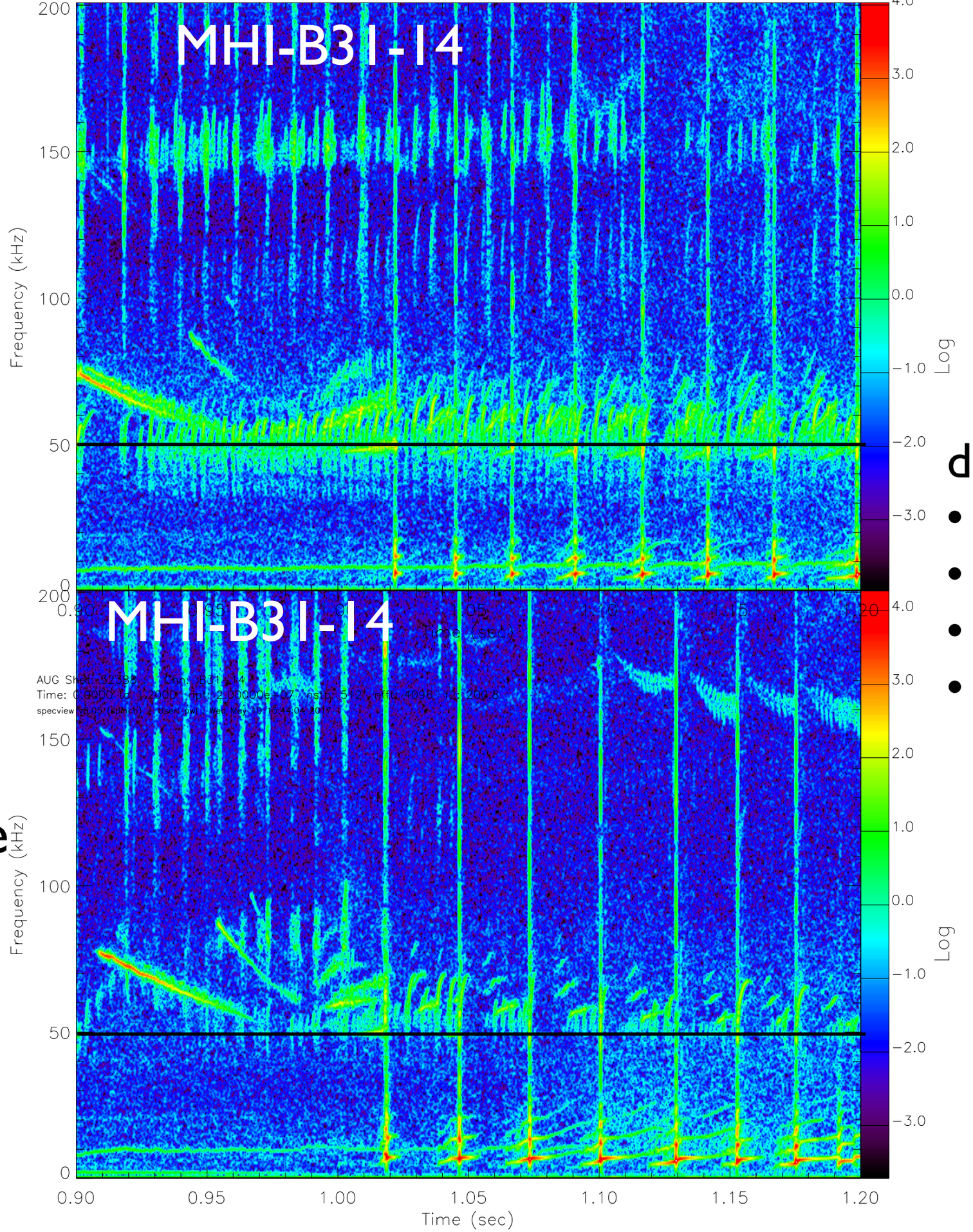
aim: change plasma shape to investigate the

- influence on EP distribution function
- influence on EGAM localisation and mode structure
- influence on non-linear coupling of EGAM and TAEs

successful change of plasma position and shape after t>0.8s



reference (#32388)



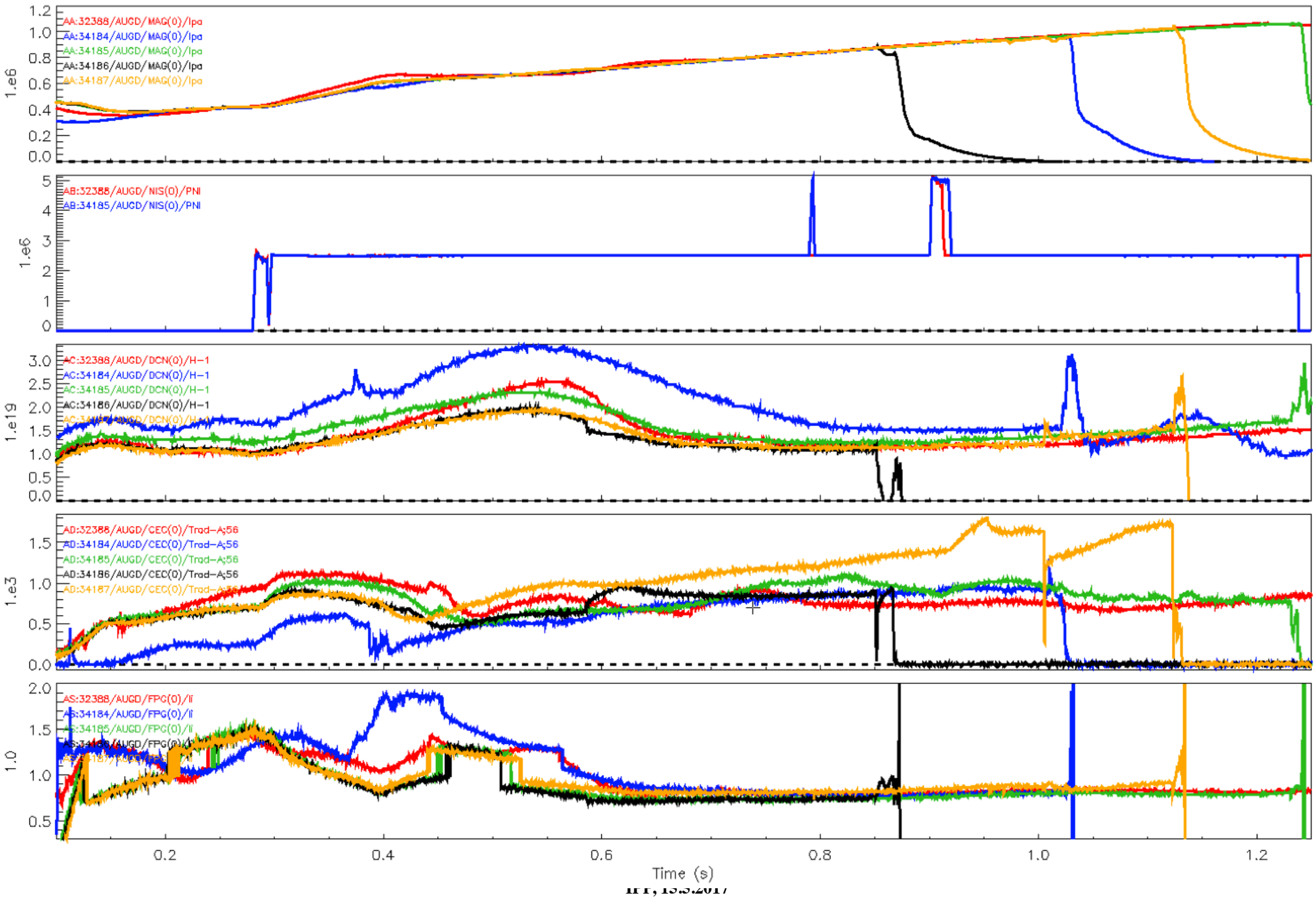
new shape (#34185)

different dynamics for:

- TAEs
- EGAMs
- TAE/EGAM coupling
- q=2 crashes

comparison to reference discharge (#32388/#34185)

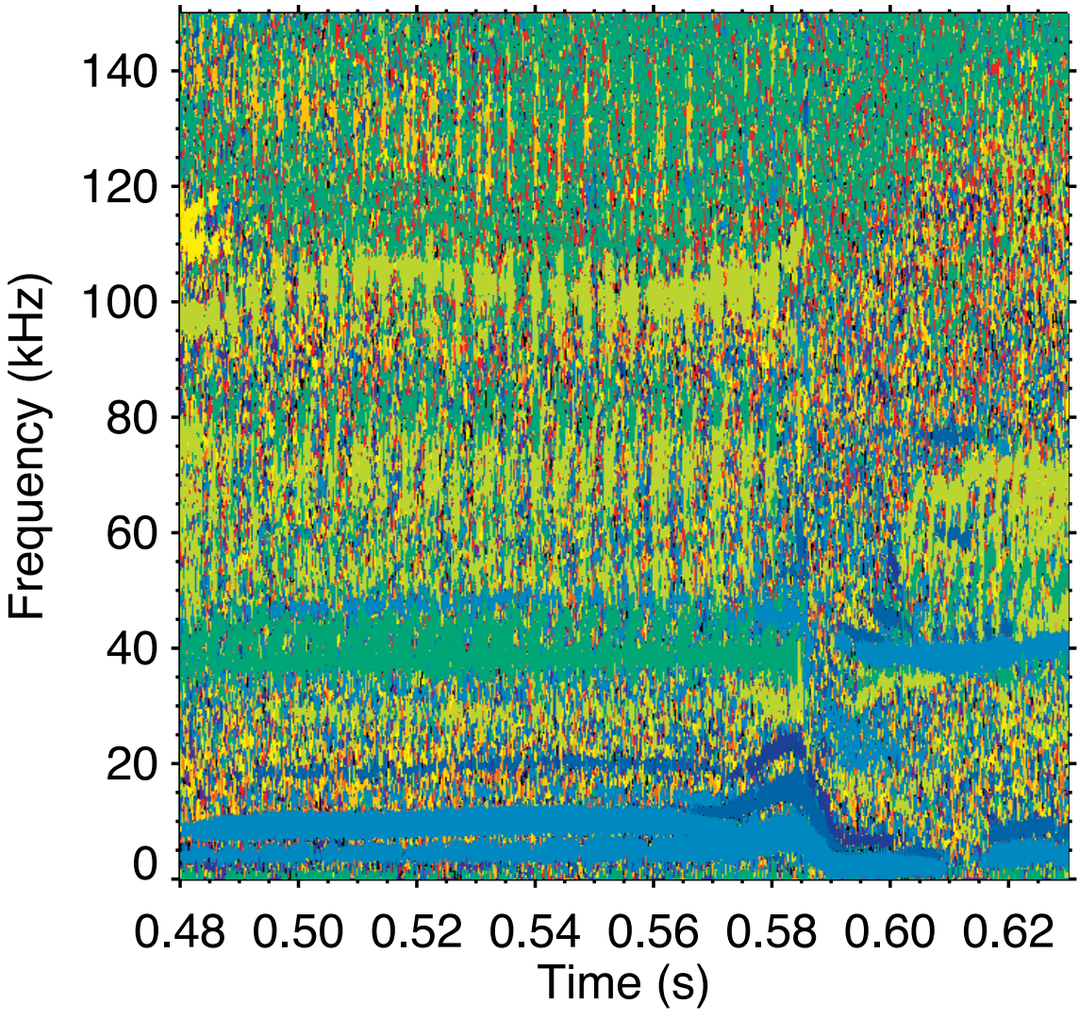
ASDEX Upgrade

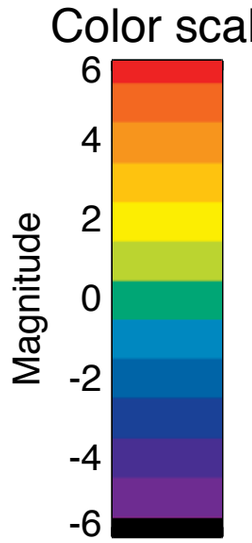


newly observed: similar crash dynamics at q=3 surface as compared to q=2 (previous slide)

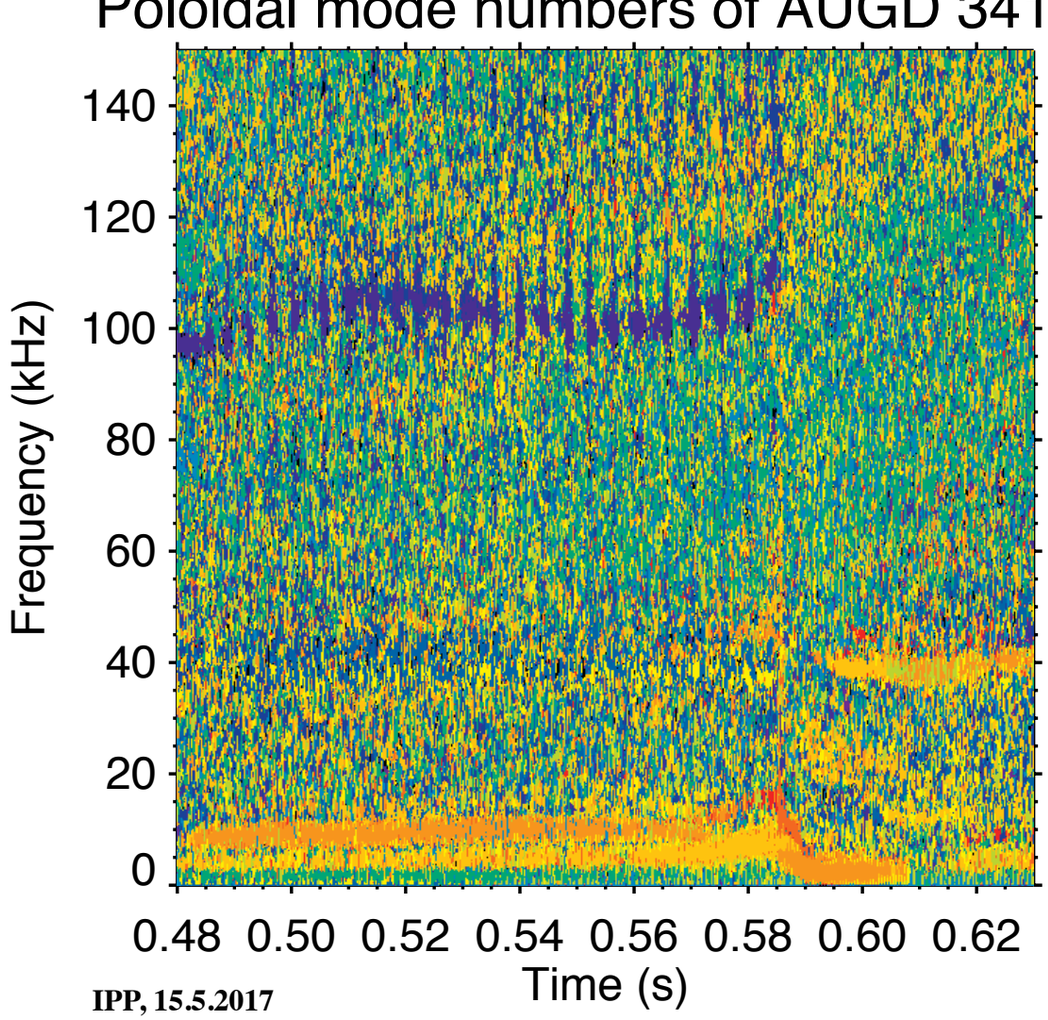
ASDEX Upgrade

Toroidal mode numbers of AUGD 34186



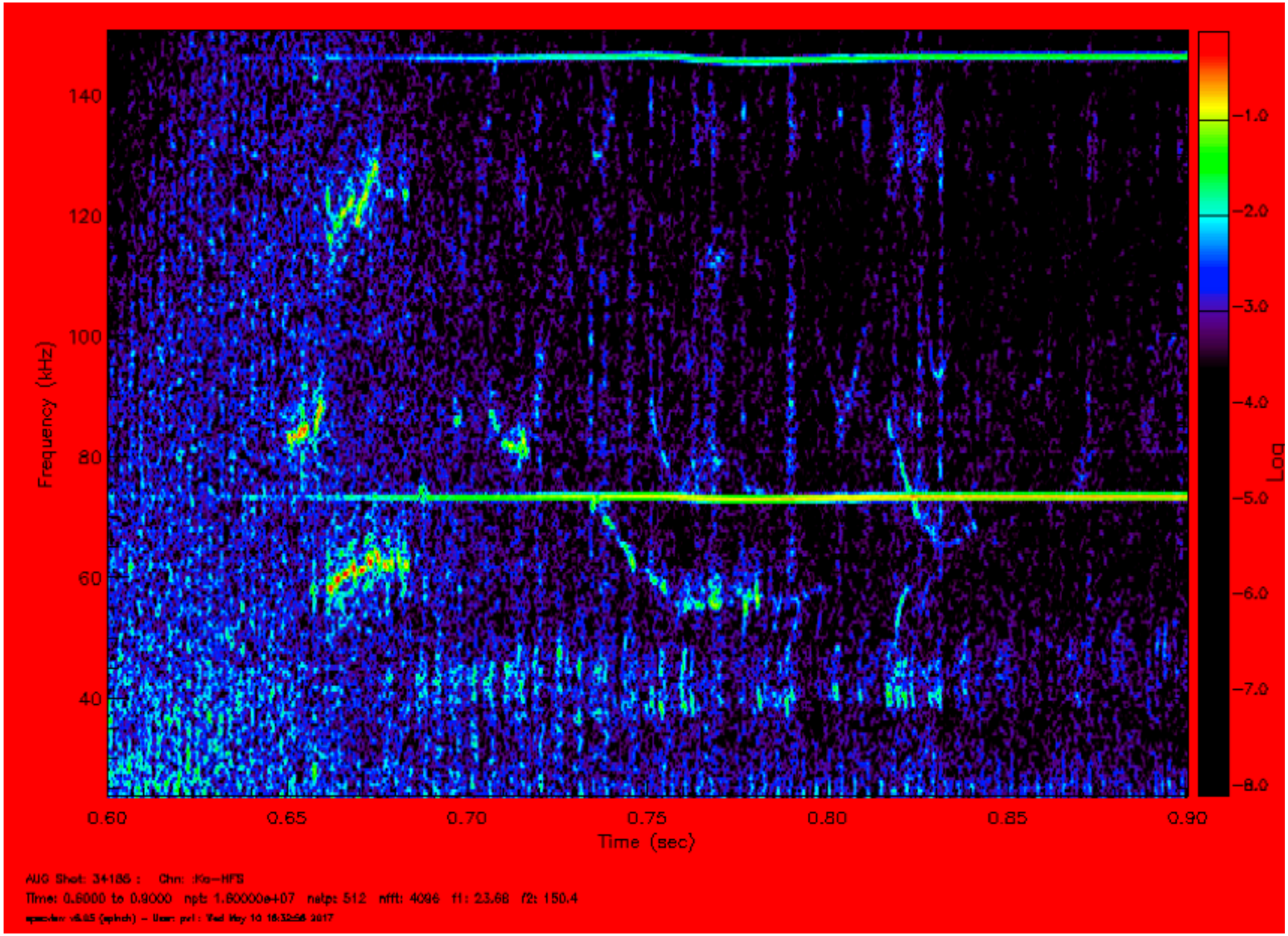


Poloidal mode numbers of AUGD 34186

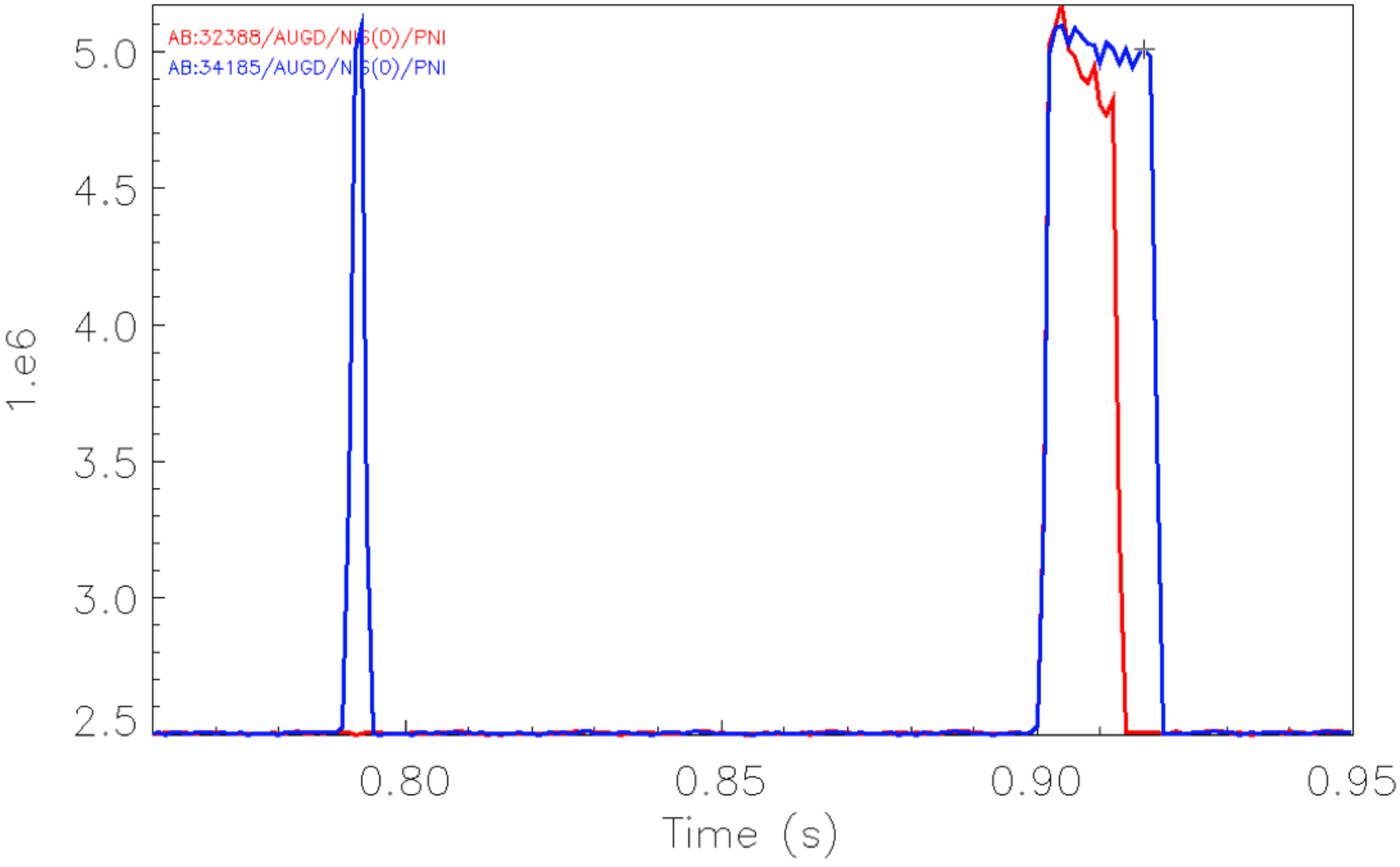


Time stamp: /afs/ipp-garc
version: 1.7.1
shot: AUGD 34186
window: Gauss
winsize: 100
0.00033333449s
fres: 1200
step: 5
averages: 0
filter: Rel_pos.
mode steps: 1
Coherence limit: 0.00000
Power limit: 0.00000 %
Q limit: 100 %
channel pairs: 190
MHI-C09-01--MHI-C09-0
MHI-C09-01--MHI-C09-0
MHI-C09-01--MHI-C09-0
MHI-C09-01--MHI-C09-0
MHI-C09-01--MHI-C09-0
MHI-C09-01--MHI-C09-0
MHI-C09-01--MHI-C09-1
MHI-C09-01--MHI-C09-1
MHI-C09-01--MHI-C09-1
MHI-C09-01--MHI-C09-1

good reflectometry data to be used for polarisation analysis



NB Q3 pre-blip: success?



other observations:

- repeatable scenario if sufficient impurities are present

- close connection to NBCD discharges (B Geiger): impurity accumulation leads to appearance of EGAMs; q=2 crashes (e.g. #34199/34200)

- co- and counter propagating TAEs observed simultaneously (both positive and negative fast ion gradients present due to off-axis injection): coupling via n=0 structures?

- preliminary bicoherence analysis hints to non-linear interactions between various modes and the EGAMs [P. Poloskei, G. Papp]

proposal for new discharges (8#) done/open

- B-field scan (3#):
  - different ratio of $\omega_{GAM}/\omega_{Alfven:}$ influence on TAE/EGAM coupling
  - changes in EGAM mode structure due to changes of orbit width of resonant EPs
- elongation scan (3#): change ratio of $\omega_{GAM}/\omega_{TAE:}$ in combination with B-field scan
- threshold scan for EGAM/TAE onset with modulated ECRH (2#): (constant 0.5MW prevents EGAM/TAE excitation)
  - influence of Te profile on thresholds

#	EGAM/BAE/	NBI	angle	behav	later heating		I	B
27923	y/y/y/n	2:0.35-0.5;3:0.38-0.59;80.59-0.63;5:0.63-0.76;7:0.76	6,65					
28880	n/y/y/n	2:0.35-0.5;3:0.5-0.6;7:0.6	6,65				I	2,4
28881	y/y/y/n	2:0.35-0.5;3:0.5-0.6;7:0.6	6,65				I	2,4
28883	n/y/n/n	2:0.35-0.5;3:0.5-0.6;7:0.6	6,65				I	2,4
28884	y/y/y/n	3:0.5-0.6;7:0.6	6,65				I	2,4
28885	y/y/y/n	2:0.35-0.5;3:0.5-0.6;7:0.6	6,65				I	2,4
30383	y/y/y/n	7: 0.26-0.75	6,65	Hmode		FILD FHA FIPM 09	I	2,6
30945	n/y/n/n	2:0.28-0.376;6:0.382-0.697	6,65	dis@4s			I	2,2
30946	y/y/n/y	2:0.28-0.445;6:0.451-0.928	6,65	Lmode	no heating!	later TAE???	I	2,2
30947	y/n/n/y	2:0.28-0.478;6:0.482-0.928	6,65	dis@4s	H mode	EGAM @1s 100kHz	I	2,2
30948	n/y/y/n	2:0.28-0.491;3:0.497-0.789	6,65	dis@1.2s	Q6@0.789		I	2,2
30949	y/y/n/n	2:0.35-0.5;3:0.38-0.79;6:0.79;7:1.0;8:1.2	6,65	dis@1.5		late EGAMs	I	2,2
30950	y/y/y/n	3:0.28-0.295;7:0.312-0.797	6,65	dis@1.5	3:0.8-0.92;6,8@0.9		I	2,2
30951	n/y/n/n	3:0.28-0.295;5:0.312-0.552,8	6,65	dis@1.7	8-0.84;3:-0.99		I	2,2
30952	y/y/y/n	3:0.28-0.295;7:0.312-0.797	6,65	dis@1.18	Q6@0.8		I	2,2
30953	y/y/n/n	3:0.28-0.295;6:0.312-0.753	6,65	dis@1.11	Q2@0.76++		I	2,2
31213	y/y/y/n	3:0.28-0.295;7:0.296-1.033	7,13	dis@1.7	Q6@1.0		I	2,2
31214	y/y/y/n	3:0.28-0.295;7:0.296-1.033	6,05	dis@1.0			I	2,2
31215	y/y/y/n	3:0.28-0.295;7:0.296-1.033	6,65	dis@1.0			I	2,2
31216	y/y/y/n	3:0.28-0.295;7:0.296-3.045+blips	6,65	Lmode		q=2 and qa>4!	I	2,2
31233	y/y/y/n	3:0.28-0.501;7:0.506-3.227	7,13	Hmode	Q6@1.0		I	2,2
31234	y/n/y/n	3:0.28-0.310;7:0.318-0.813	7,13	dis@ 0.8			I	2,2
32326	y/n/y/y	7: 0.28 +blips	7,13	EGAMS, TAEs			I	2,2
32327	y/n/y/n	7: 0.28 +blips: 82kV	7,13	transition			I	2,2
32328	n/n/n/n	7: 0.28 +blips +0.5 ECRH	7,13	only turbulence			I	2,2
32329	n/n/n/n	7: 0.28 + blips+0.5 ECRH	7,13	only Alfvenic turb			I	2,2
32384	y/n/y/n	7: 0.28 +blips 93kV	7,13	too high density			I	2,2
32386	y/n/n/n	7: 0.28 +blips: 65kV	7,13				I	2,2
32387	y/n/y/y	7+6: 0.28 +blips: 65kV	7,13				I	2,2
32388	y/y/y/y	7: 0.28 +blips + higher density 93kV	7,13				I	2,2
33872	y/y/y/y	7: 0.28 +blips + higher density 93kV	7,13		diff breakdown	no Te inversion		2,2
33873	y/y/y/y	7: 0.28 +blips + higher density 93kV	7,13		diff breakdown	no Te inversion		2,5
33874	y/y/y/y	7: 0.28 +blips + higher density 93kV	7,13	dis@1.0	std brkdwn	no Te inversion		2,0
33875	y/y/y/y	7: 0.28 +blips + higher density 93kV	7,13	dis@1.0s	std brkdwn	no Te inversion		2,2
34184	y/y/y/y	7: 0.28 +blips + higher density 93kV	7,13	shape scan t>0.8		Te inversion		2,2
34185	y/y/y/y	7: 0.28 +blips + higher density 93kV	7,13	shape scan t>0.8		Te inversion		2,2
34186	y/y/y/y	7: 0.28 +blips + higher density 93kV	7,13	std		Te inversion		2,2
34187	y/y/y/y	7: 0.28 +blips + higher density 93kV	6,65	std		Te inversion		2,2