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# **WaveMon veto Analysis**

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# WaveMon VETO



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- **Veto triggers are generated by WaveMon – DMT tool with algorithms similar to WaveBurst.**  
**<http://www.ligo.caltech.edu/docs/G/G020383-00.pdf>**  
**<http://www.phys.ufl.edu/LIGO/bursts/>**
- **WaveMon looks at coincidence of AS\_Q channel and an auxiliary channels: MC\_F , MICH\_CTRL , REFL\_I , REFL\_Q , POB\_I, POB\_Q, LVEA\_V1, MAG1X, SEISX, ....**  
**two clusters are generated for each trigger: VETO and ASQ**
- **See more on veto analysis at**  
**<http://www.phys.ufl.edu/LIGO/bursts/wavemon/S2.html>**  
**rates, frequency distribution, etc**

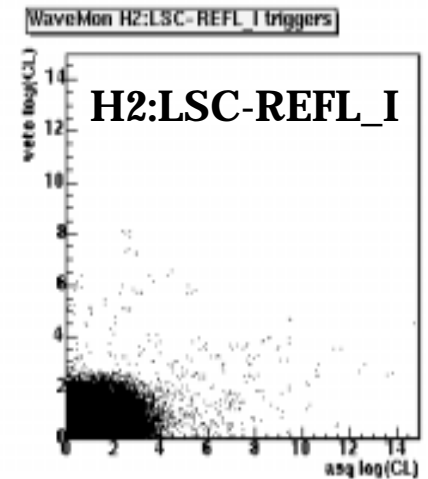
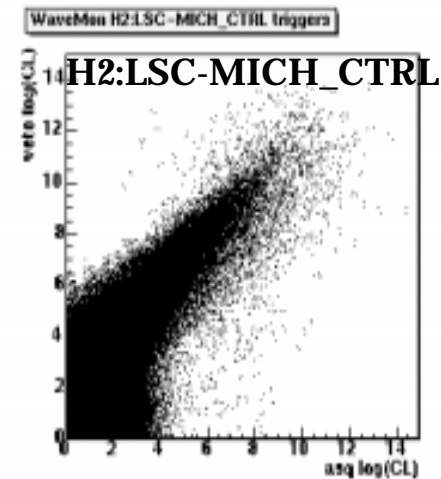
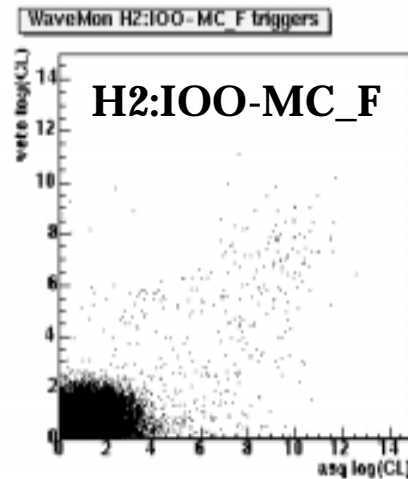
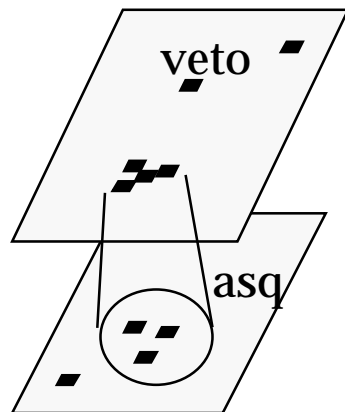
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# raw WaveMon VETO triggers

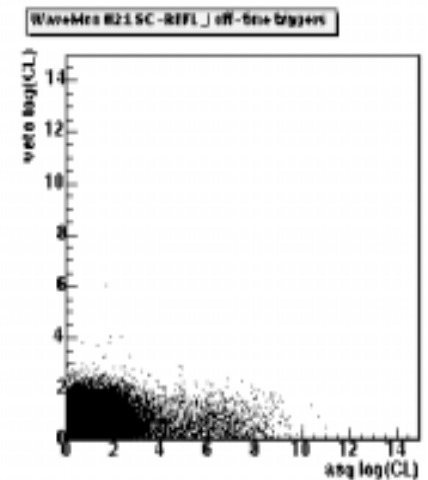
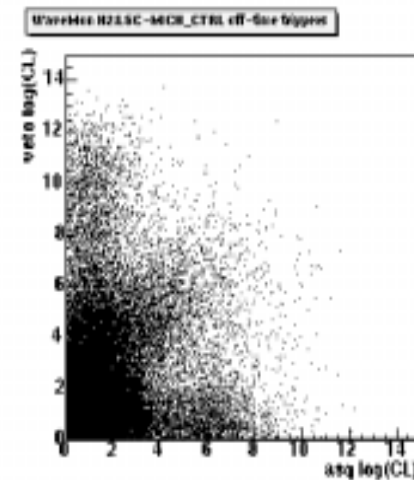
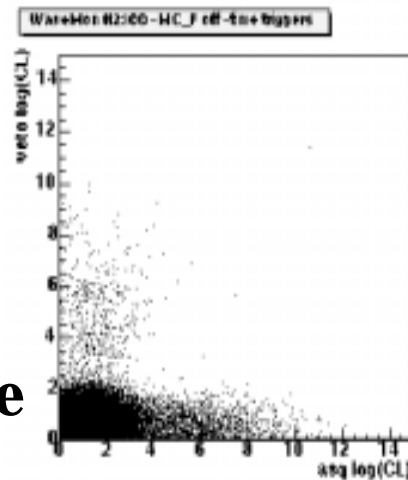


- correlation of strength of VETO (Y axis) and ASQ (X axis) clusters at 0 and 15 sec time lags.

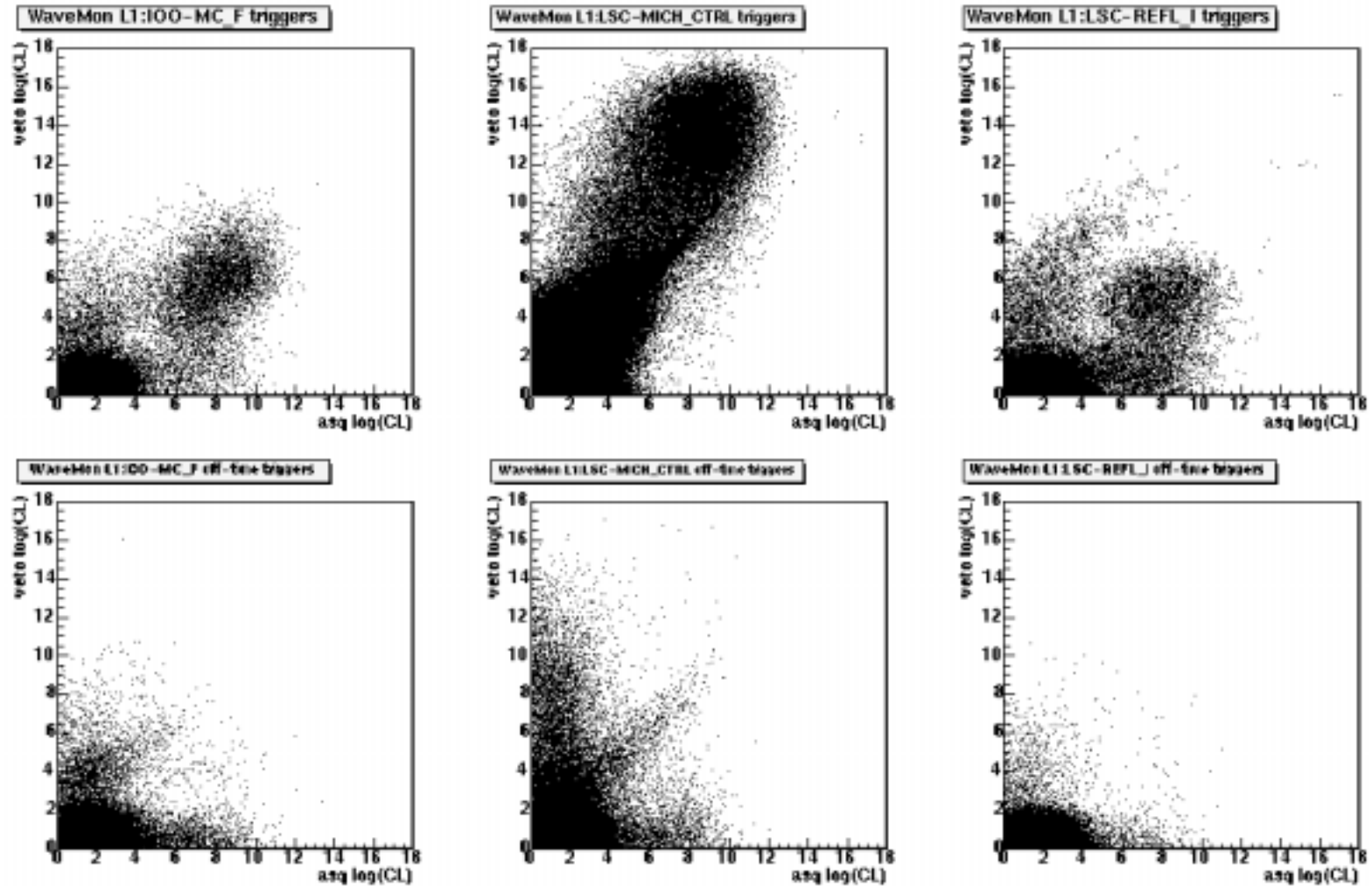
on-time



off-time

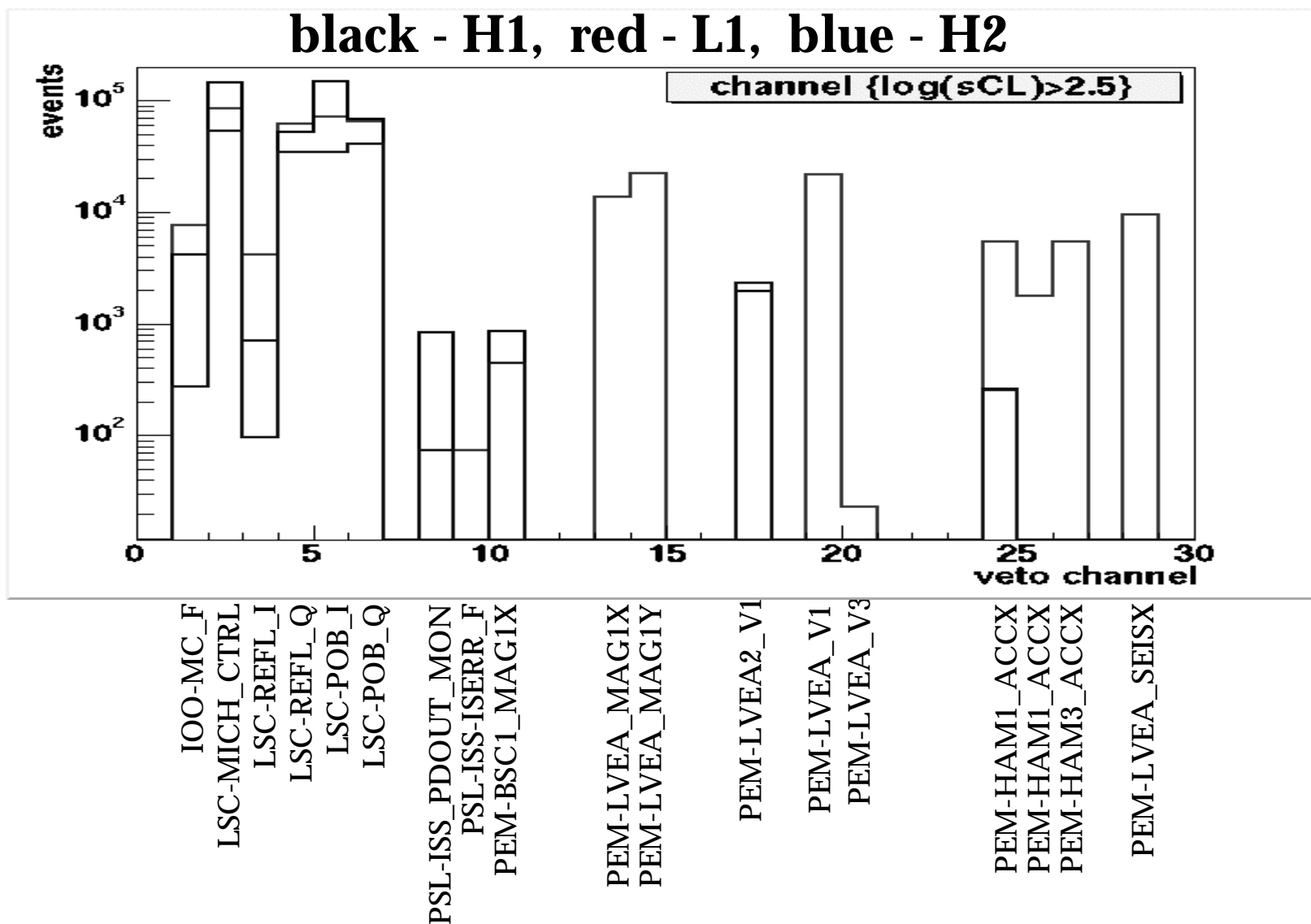


# L1 raw VETO triggers



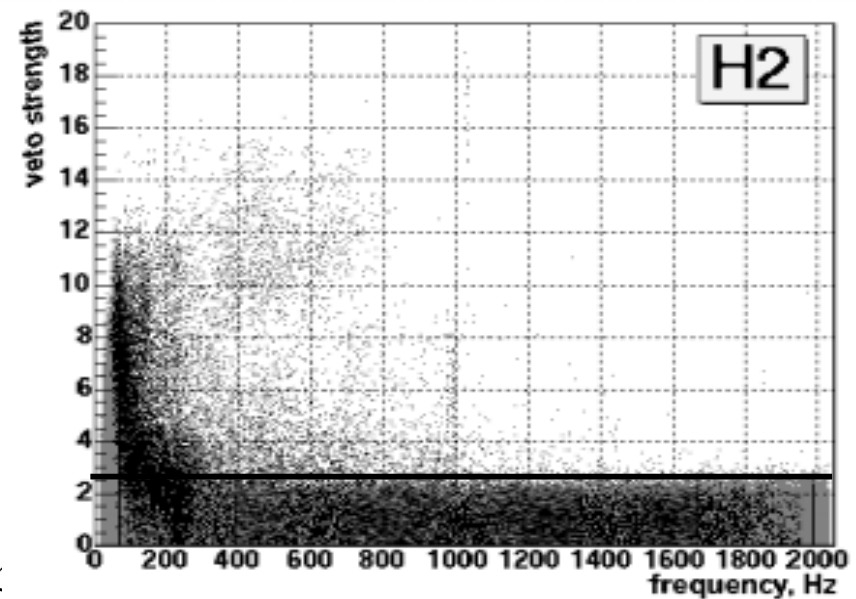
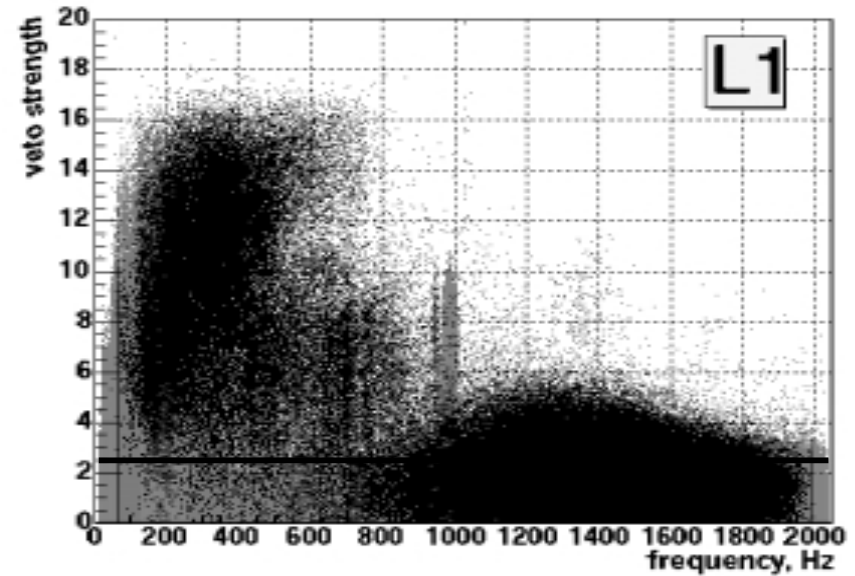
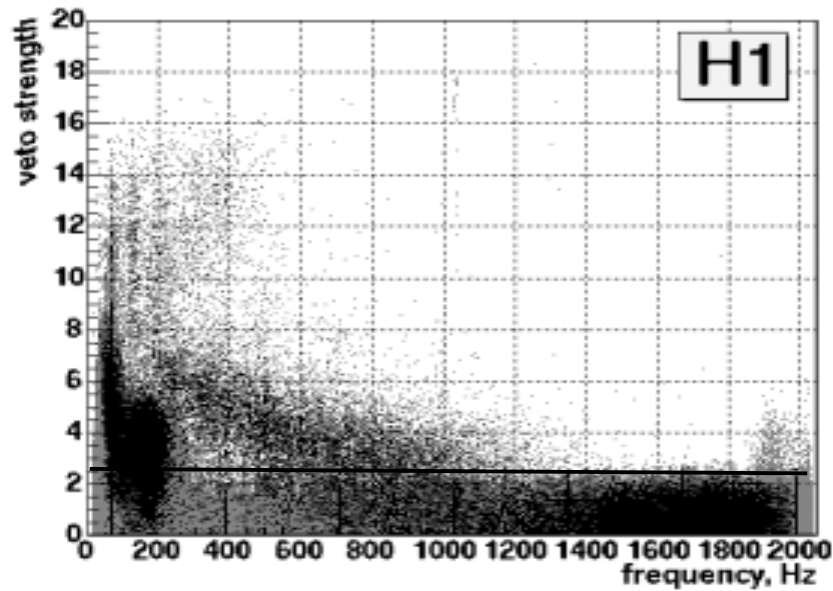
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# Triggers Per Channel (all S2 data)



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# raw veto strength vs frequency



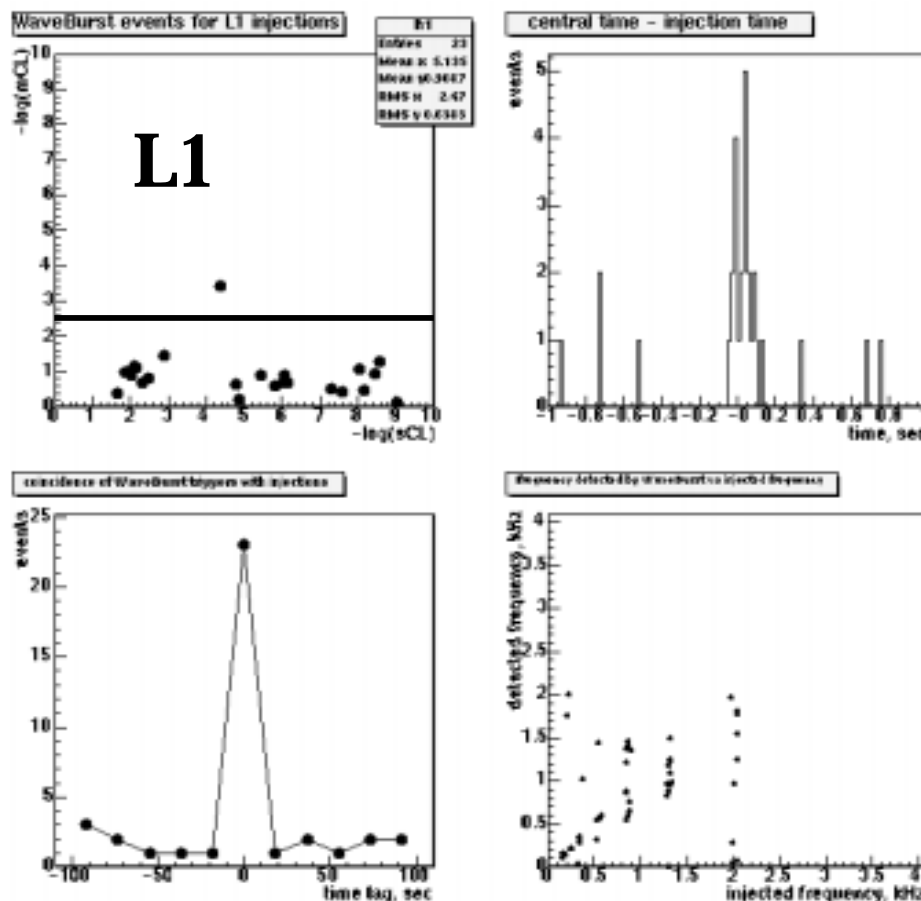
-----“safe veto”  
threshold

LIGO-G0:

# Safe WaveMon VETO



- Check with hardware injections if there is any x-coupling between veto and ASQ channels
- Select safe triggers by setting a threshold on strength of veto clusters.



## vetoed injections

	total inject	raw Veto (bkgnd)	safe Veto (bkgnd)
H1	416	28 (4.7)	1 (0.4)
H2	348	22 (3.1)	0 (0.1)
L1	360	36 (5.9)	1 (0.3)

**limit on GW losses  
due to x-coupling  
<4%**

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# Dead Time



- Veto is applied to ETG triggers coincident in time, the whole frequency band is excluded → Veto Dead Time Fraction

## S2 veto statistics

	<b>S2 sec</b>	<b>raw veto</b>	<b>safe veto</b>	<b>dead time sec</b>	<b>dead time fraction, %</b>
<b>H1</b>	<b>3757262</b>	<b>1705K</b>	<b>425K</b>	<b>66360</b>	<b>1.8</b>
<b>H2</b>	<b>2958351</b>	<b>754K</b>	<b>167K</b>	<b>25300</b>	<b>0.9</b>
<b>L1</b>	<b>1930967</b>	<b>1422K</b>	<b>373K</b>	<b>48799</b>	<b>2.5</b>



# Summary & Plans



- **Characterization of S2 WaveMon veto sample is completed**
- **Using hardware injections the procedure for selection of safe vetoes is defined**
- **Re-run WaveMon on-line on larger number of channels and wider frequency band.**
- **Study of veto efficiency (coincidence with ETGs triggers)**