

A few CNGS events in Borexino

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On behalf of Borexino collaboration

Overview



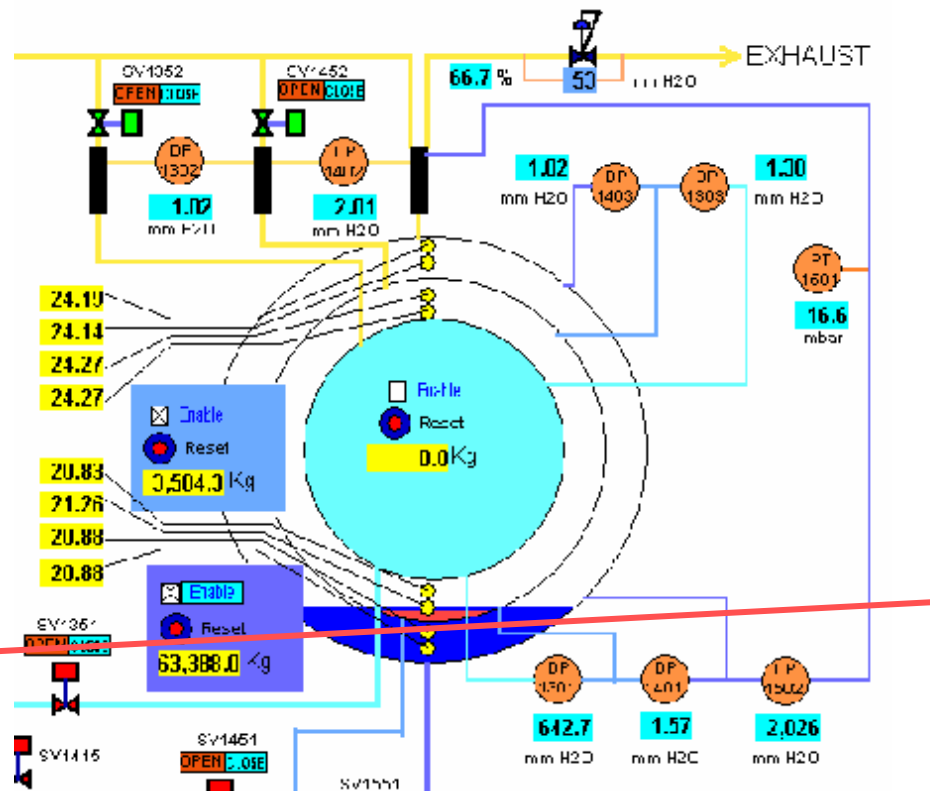
- Borexino status during this run
- A few events
- Evidence for beam detection
- Perspectives for October run

Status of Borexino during this CNGS run

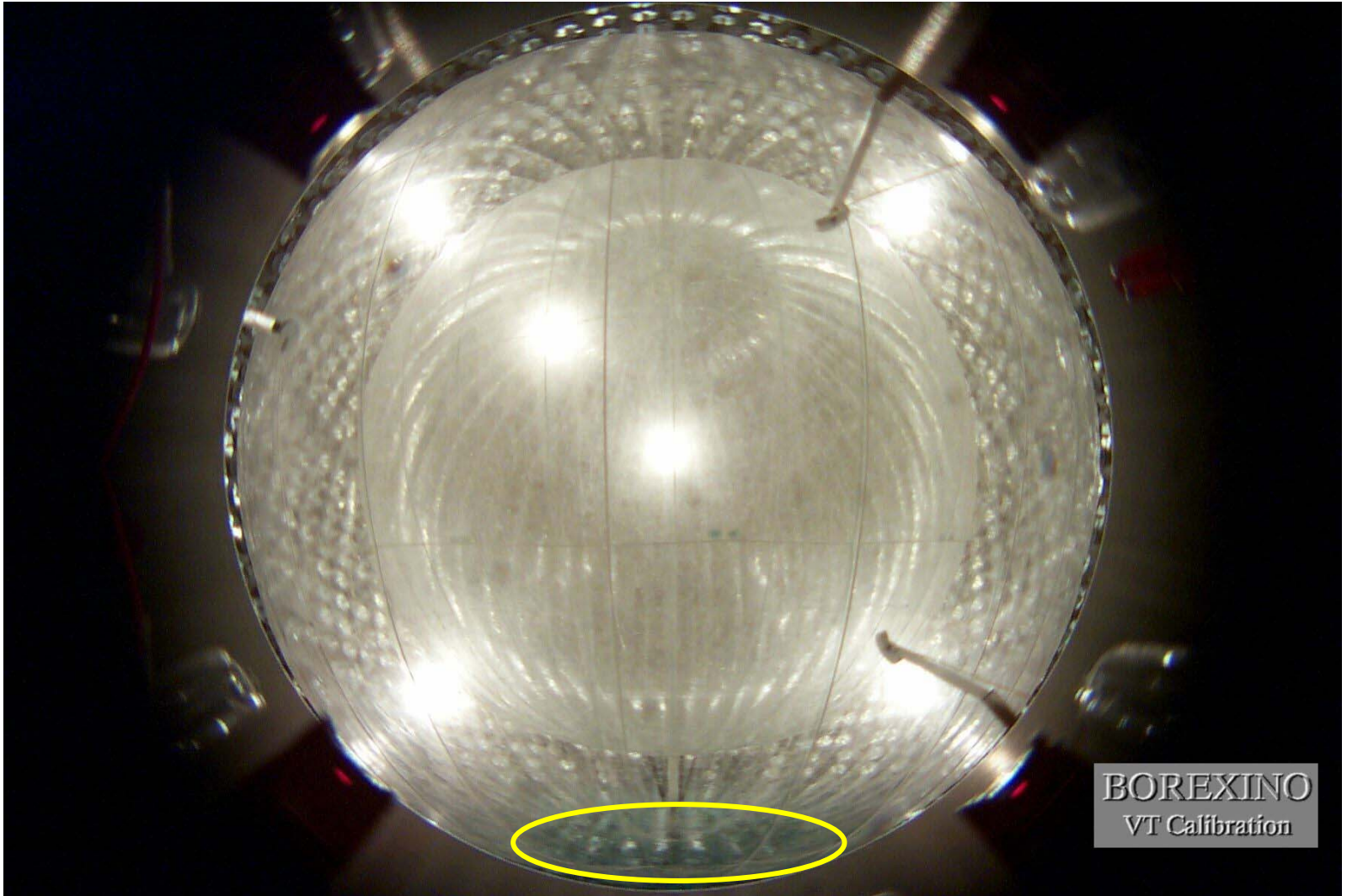


- The filling of the Borexino Stainless Steel Sphere (SSS) has started on August 1^o, 2006
 - During this run, about **55 t of water** were present
 - The height of the water from the bottom of the SSS is about **1.8 m**
 - **Active surface ~ 10.5 m²**

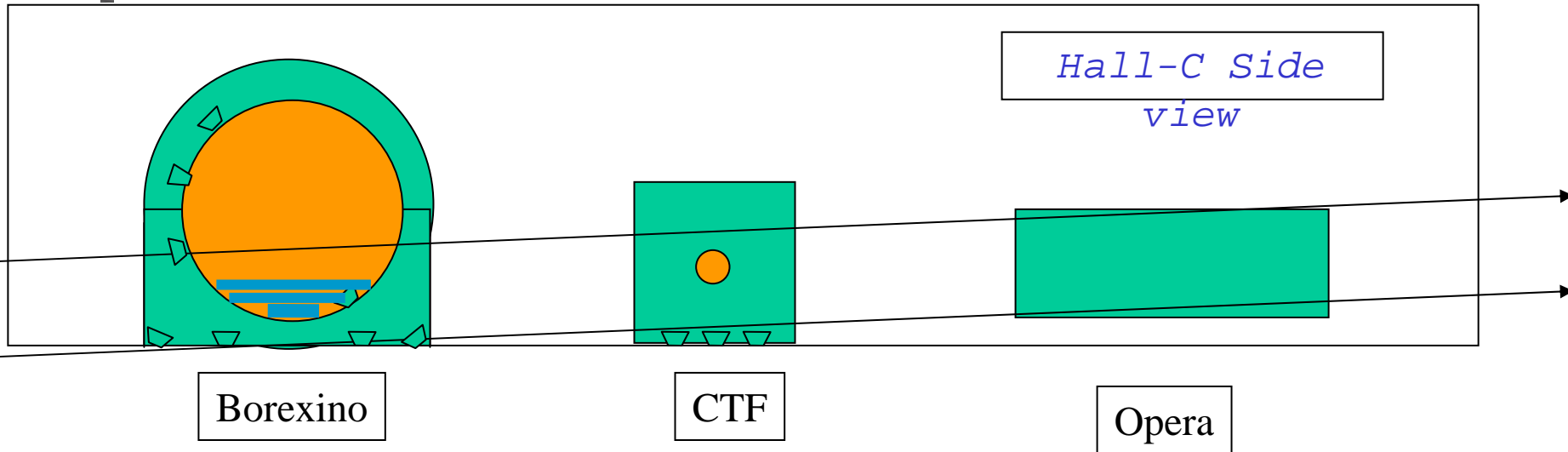
Beam direction



Status of filling



Current acceptance and target mass



L. Perasso

Water level height: 1.8 m

Target Mass: 55 t

(not relevant and not considered in this run)

Rough preliminary analysis

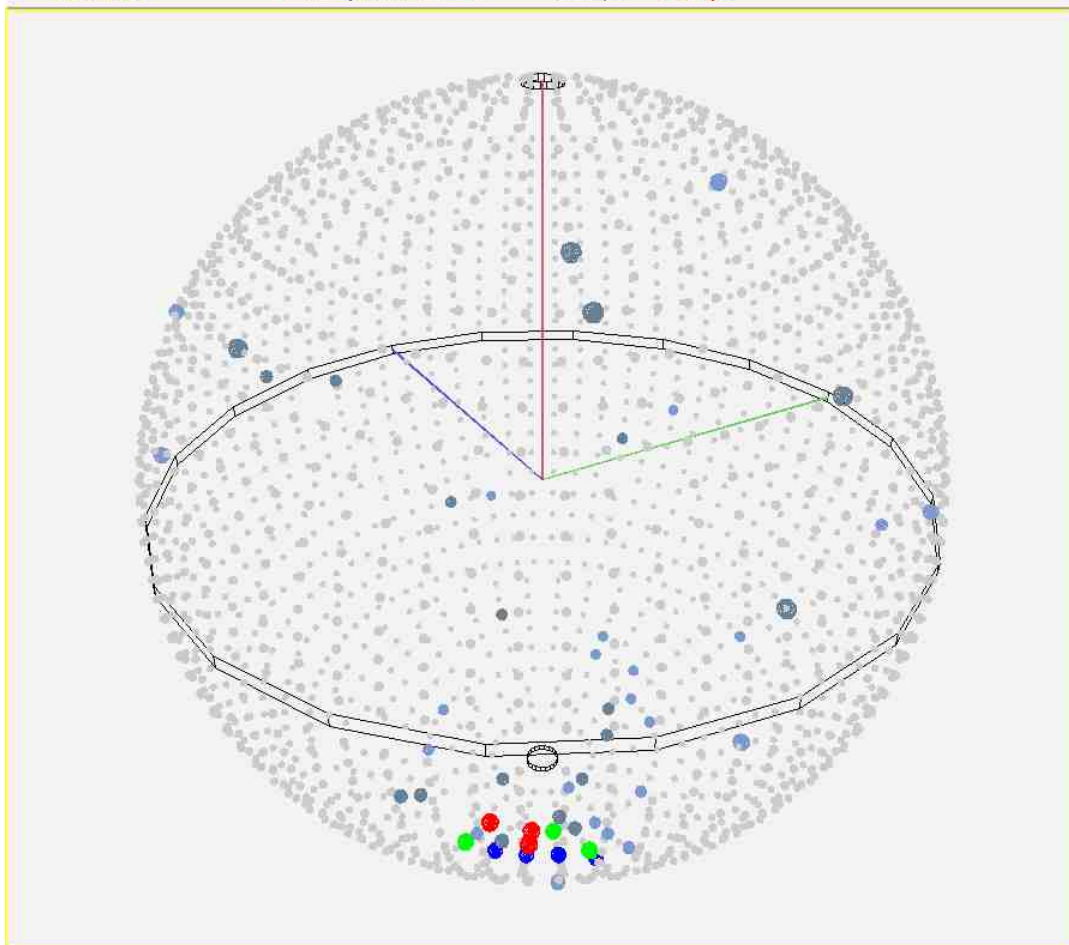


- The small pool of water now available does not allow us to reconstruct the direction of the muon
 - The CNGS signal is on top of a much larger cosmic muon signal
 - The analysis right now selects events that have prompt light mostly in the “pool” (PMTs below the water level)
 - Evidence of CNGS can be obtained only relying on time correlation with CNGS (thanks to G. Sartorelli and LVD guys for help in getting CNGS data base infos from CERN)
 - Borexino events have a GPS time stamp with nominal 100 ns precision
 - ~ 30 hours of statistics analyzed.

Event display (1)



Run: 002618	Number of pmt hits: 0056	No hits	< 3.2 pe		
Event: 046557	Total Charge (pe): 96.0	< 1.2 pe	< 5.2 pe	0.0 < Time < 200.0 ns	
Cluster: 1	x Axis	y Axis	z Axis	< 2.2 pe	> 5.2 pe



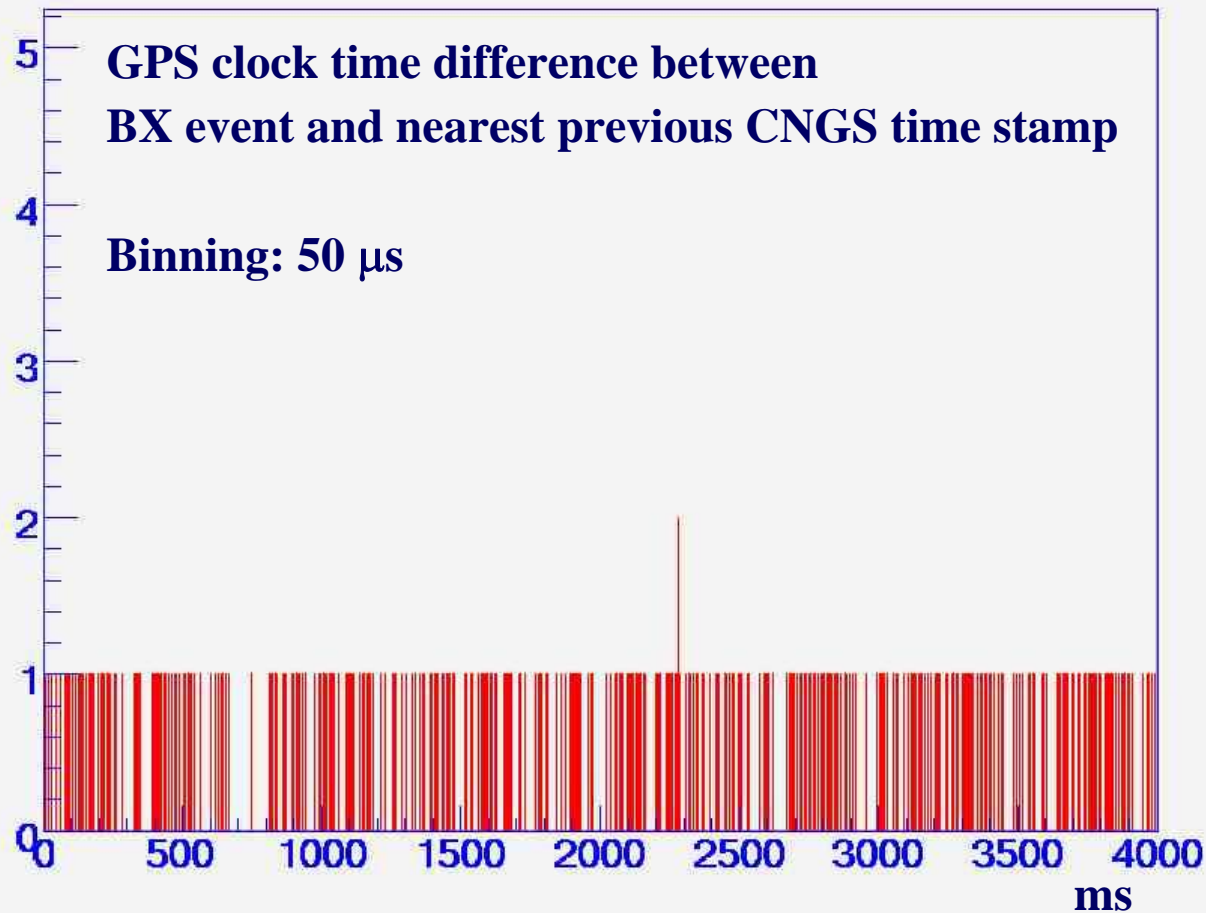
Event Display (2)



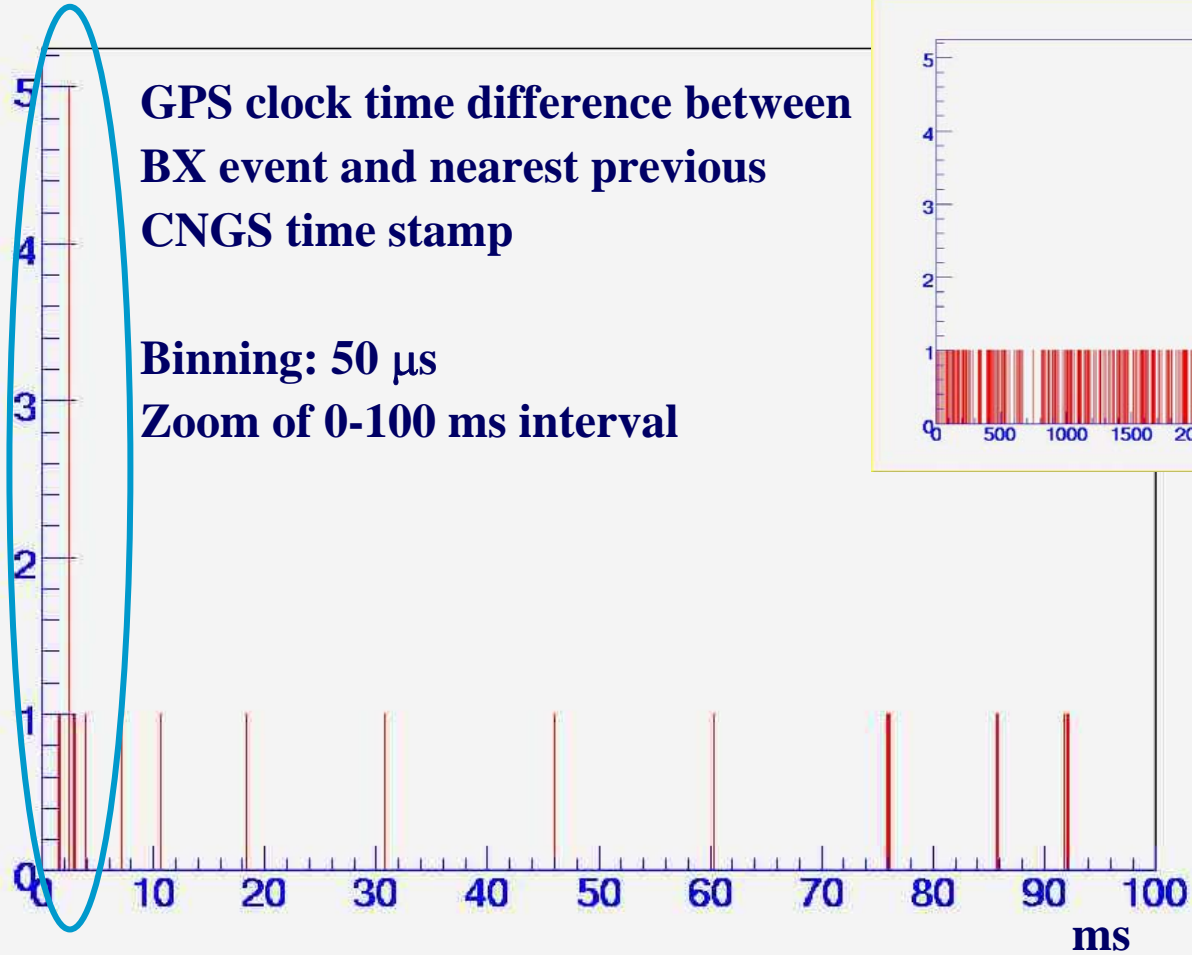
r002618_e39069.gif

Movie_CNGS_Run2625_Ev15239_fast.gif

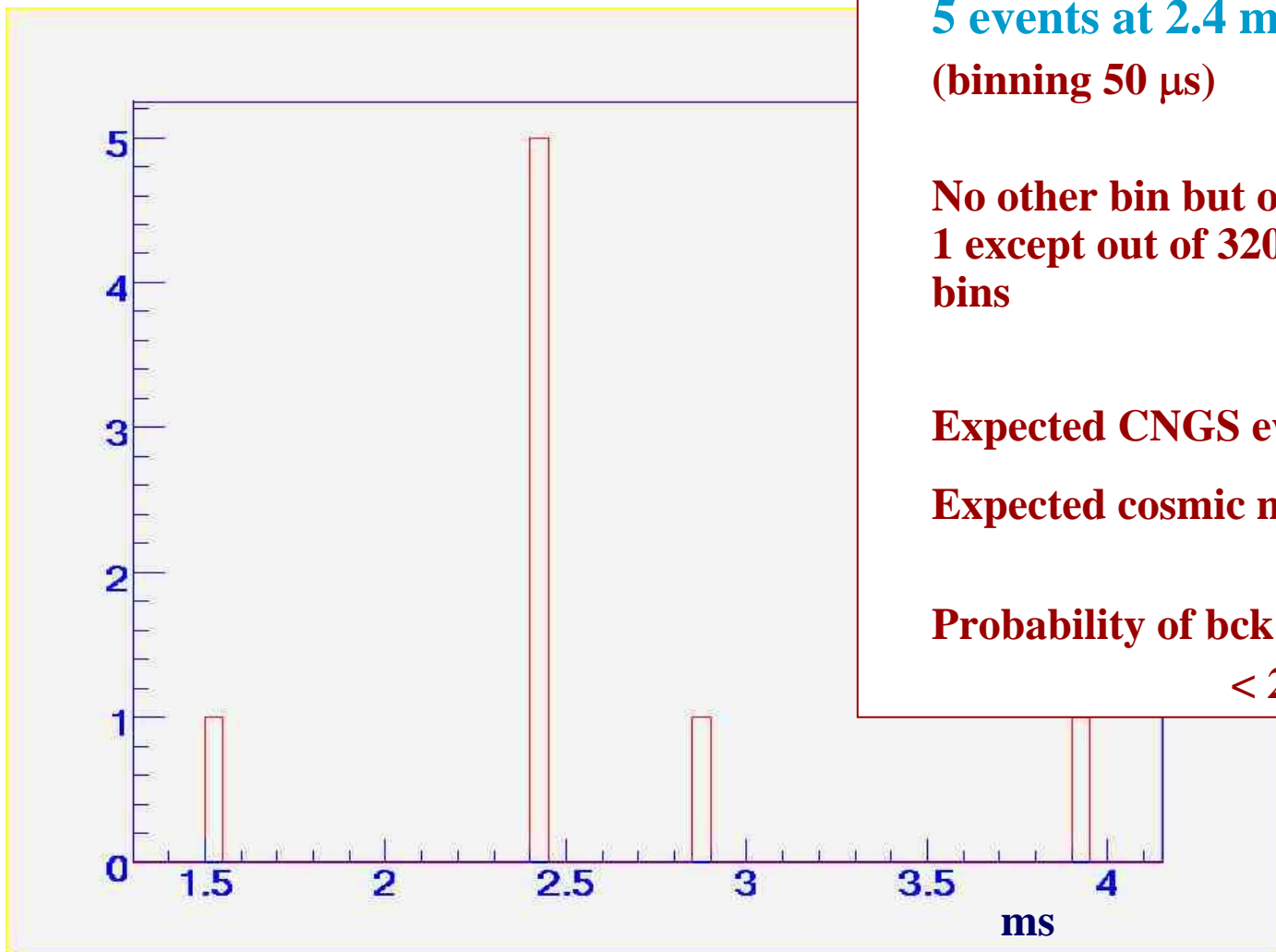
Preliminary evidence for signal (1)



Preliminary evidence for signal (2)



Preliminary evidence for signal (3)



5 events at 2.4 ms delay

(binning 50 μ s)

No other bin but one has more than 1 except out of 3200 events in 8000 bins

Expected CNGS events: 5

Expected cosmic muons: ~ 2000

Probability of bck fluctuation:

$< 2 \cdot 10^{-5}$

Perspectives for October



- If everything runs smoothly, in October we will be almost full
 - About 150 ev/day are expected (muons in rock) @ nominal intensity
 - About 18 ev/day interacting in the water @ nominal intensity
- We should be able to measure easily beam intensity
- We might work as active target for Opera

Conclusion



- Reasonably clear evidence of CNGS events
- 5 events
- Well, maybe not so many, but target is still very small, and please consider that **these are the first real events detected by Borexino since ever.**

■ **Not so many, but wonderful!**