

20170111 STATUS REPORT

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From ALPHA paper review, Nature(2016)

Experimental results

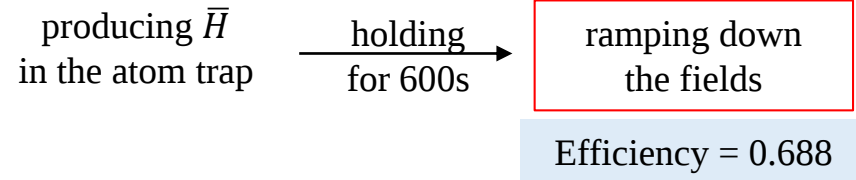


Table1. Detected events during 1.5s ramp down

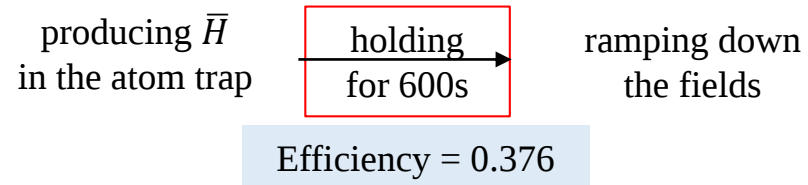
Type	Number of detected events	Background	Uncertainty
Off resonance	159	0.7	13
On resonance	67	0.7	8.2
No laser	142	0.7	12

→ survived(trapped) atoms

- 1) Off resonance ~ no laser
no laser-related side effects leading to H loss
- 2) On ~ Off resonance
 $159 - 67 = 92 \pm 15 \text{ counts}$
 $\therefore \frac{92}{0.688} \approx 134 \text{ atoms removed by On-res. laser}$
 $\therefore \frac{92}{159} \approx (58 \pm 6)\% \text{ of trapped atoms removed}$
→ consistent with hydrogenic rate estimates
(simulation results)

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Experimental results



- 1) Comparing with background
Off resonance & No laser $\sim$ background(28)
Only On resonance type is different(79)

- 2) On $\sim$ Off resonance

$$79 - 27 = 52 \pm 10 \text{ counts}$$

$$\therefore \frac{52}{0.376} \approx 138 \text{ atoms removed by On-res. Laser}$$

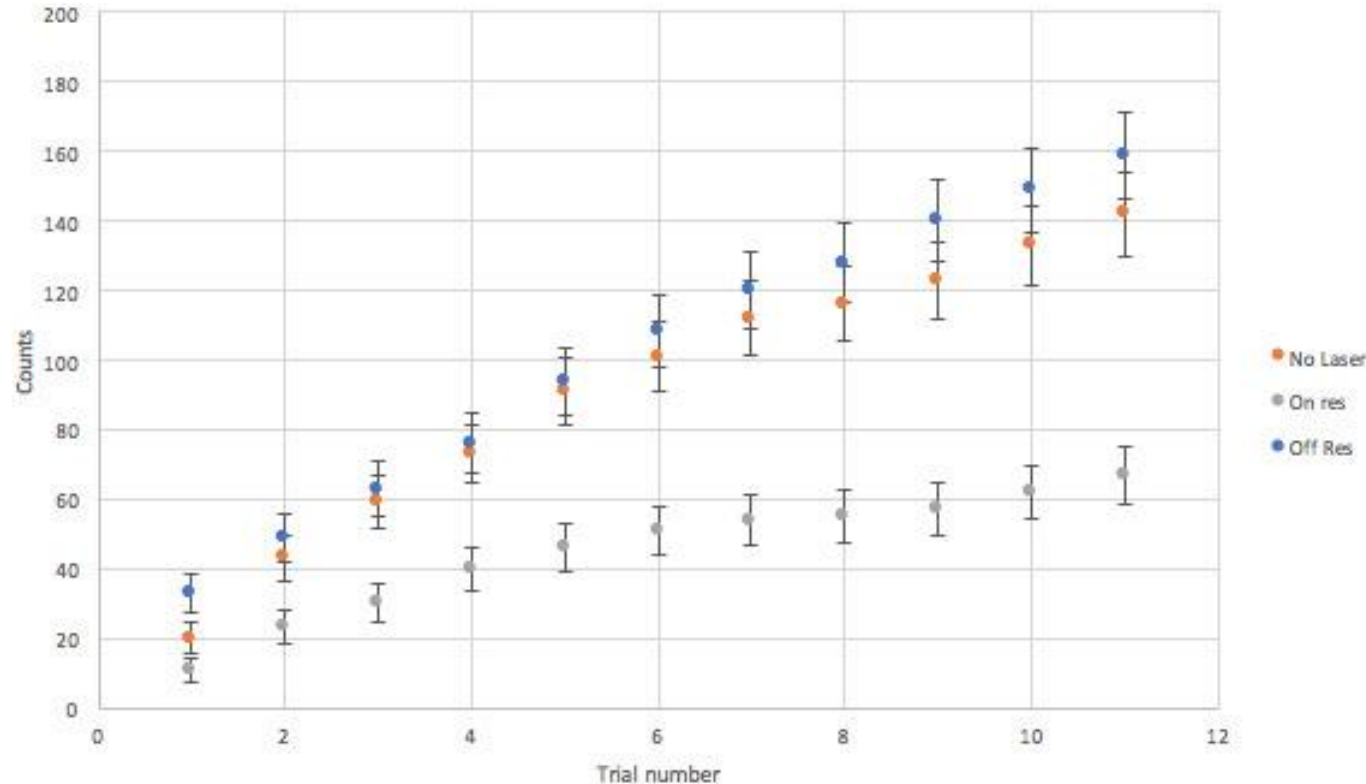
→ consistent with the result before(134)

Table2. Detected events during 300s hold times for each transition, and their sum

Type	Number of detected events	Background	Uncertainty
d-d off res.	15	14.2	3.9
d-d on res.	39	14.2	6.2
No laser	22	14.2	4.7
c-c off res.	12	14.2	3.5
c-c on res.	40	14.2	6.3
No laser	8	14.2	2.8
d-d + c-c off res.	27	28.4	5.2
d-d + c-c on res.	79	28.4	8.9
No laser(sum)	30	28.4	5.5

→ lost(untrapped) atoms

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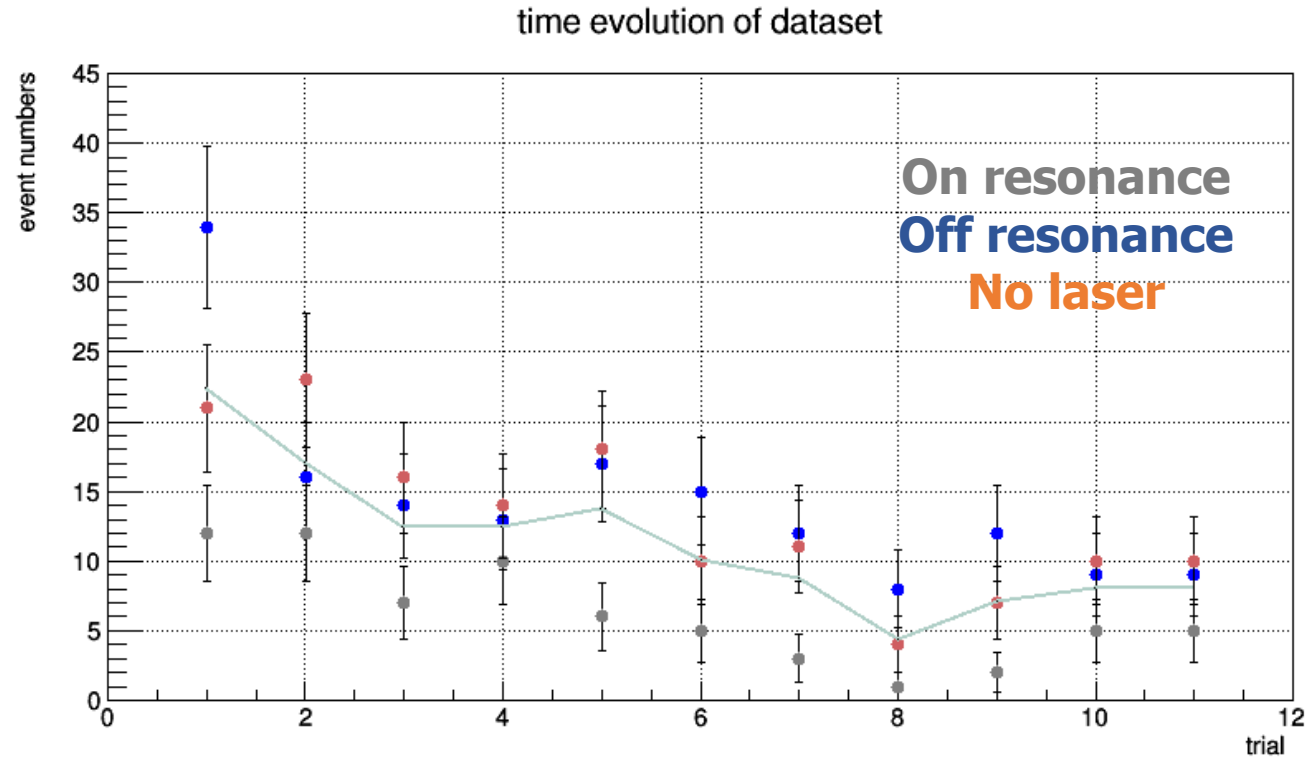
Extended Data Figure1

Time evolution of the dataset.

The cumulative number of observed events for each type of trial is plotted as a function of chronological trial number to illustrate the time history of the dataset.

The errors are due to counting statistics($\sqrt{N}$) only.

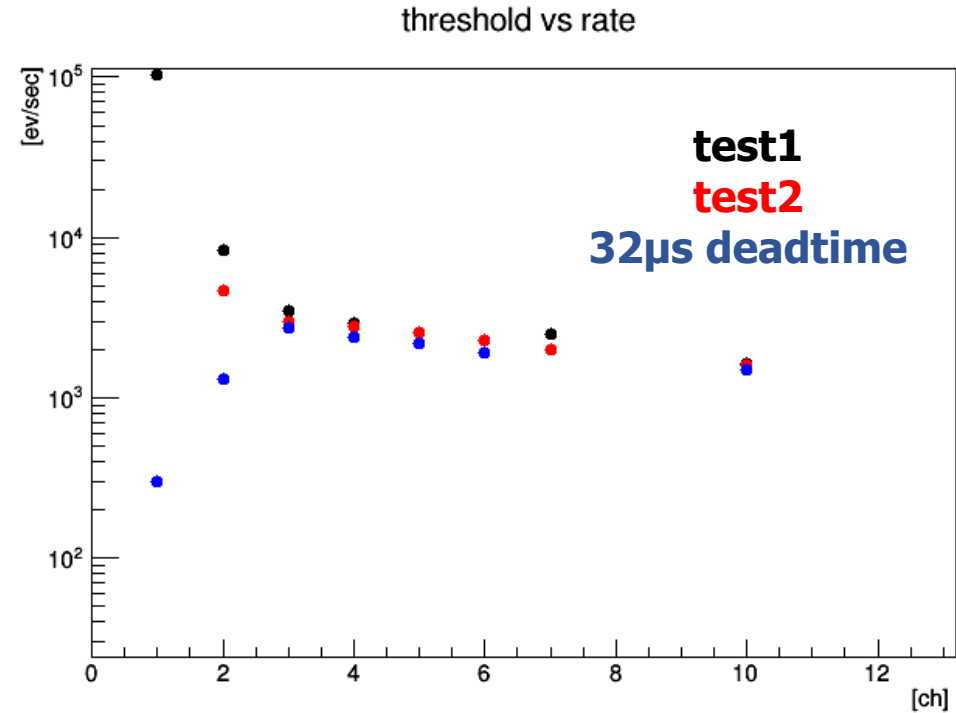
From ALPHA paper review, Nature(2016)



Total average ~ 12.3

But fluctuations exist

FADC : threshold vs event rate



All similar after th=10.
But Before th=3, 32 μ s deadtime has opposite trend.

FADC : threshold vs event rate

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파일(F) 편집(E) 보기(V) 검색(S) 터미널(T) 도움말(H)
USB3Read: Could not make read request; error = -1
USB3Read: Could not make read request; error = -1
USB3Read: Could not make read request; error = -1
USB3Read: Could not make read request; error = -1
USB3Read: Could not make read request; error = -1
USB3Read: Could not make read request; error = -1
USB3Read: Could not make read request; error = -1
USB3Read: Could not make read request; error = -1
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Moreover,
Sometimes there are errors.
(usually when event rate is high.)