E884 : INDRA Si-CsI identifications

John Frankland

- Scaling of *ΔE-E* matrices
- Identification of fragments ($Z \geq 2$)
- Identification of H isotopes
- Data quality audit

E884 : INDRA Si-CsI identifications

John Frankland

- Scaling of *ΔE-E* matrices
- Identification of fragments (Z≥2)
- Identification of H isotopes
- Data quality audit

Scaling of *ΔE-E* matrices

Telescope groups [same/similar Si thickness]:

Rings 6/7: 1-6 21-22; 7-10; 11-14*; 15-20; 23-24 *(0712 did not scale)

Rings 8/9: 1-2 9-10; 3-6; 7-8 11-14 23-24; 15-16 19-20; 17-18 21-22

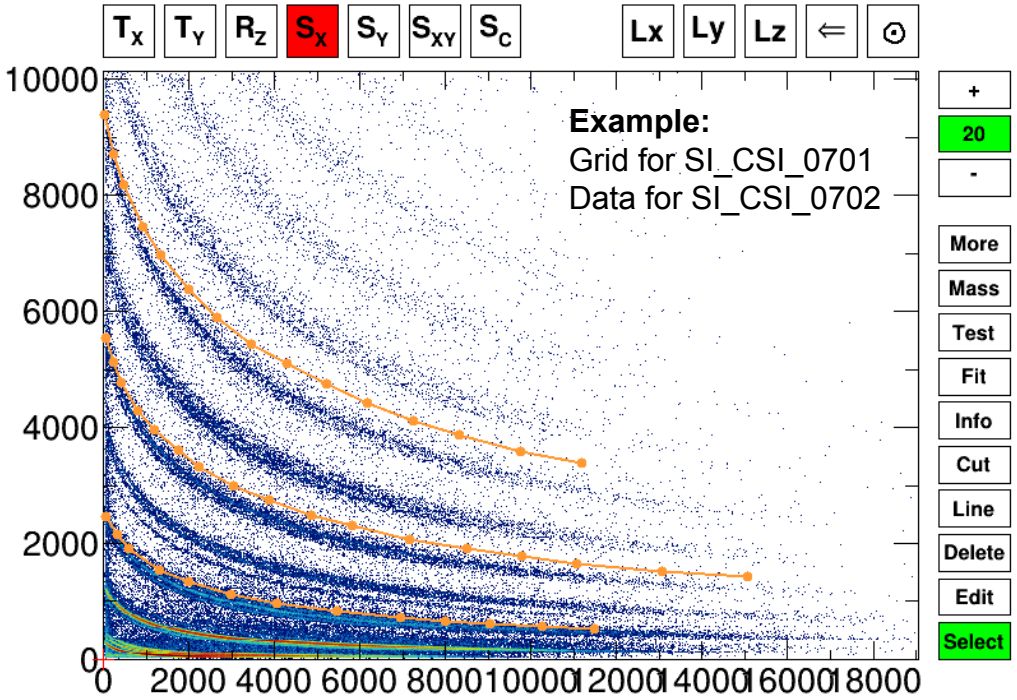
Scaling of *ΔE-E* matrices

Telescope groups [same/similar Si thickness]:

Rings 6/7: 1-6 21-22; 7-10; 11-14*; 15-20; 23-24 *(0712 did not scale)

Rings 8/9: 1-2 9-10; 3-6; 7-8 11-14 23-24; 15-16 19-20; 17-18 21-22

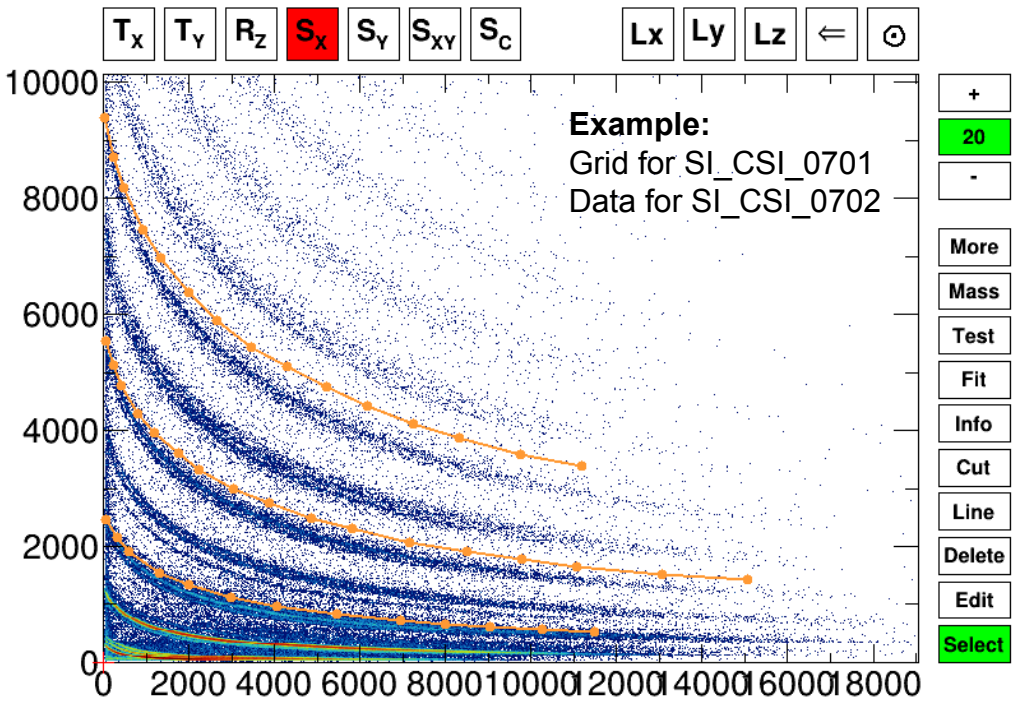
3 isotopic lines drawn for 1st telescope of each group



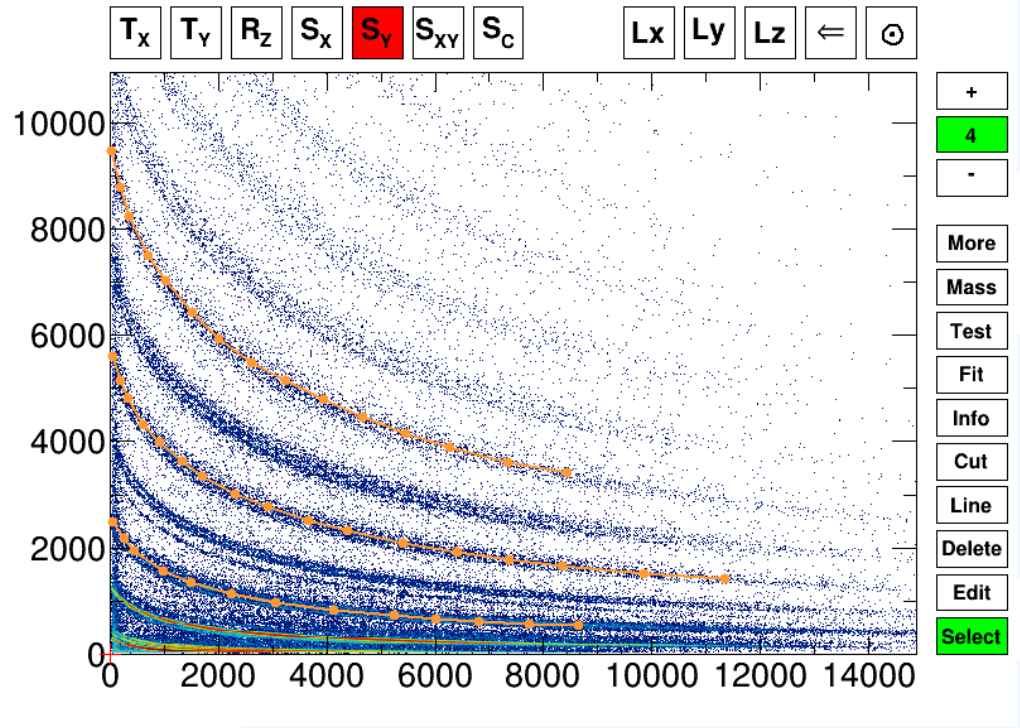
Scaling of *ΔE-E* matrices

Telescope groups [same/similar Si thickness]:
Rings 6/7: 1-6 21-22; 7-10; 11-14*; 15-20; 23-24 *(0712 did not scale)
Rings 8/9: 1-2 9-10; 3-6; 7-8 11-14 23-24; 15-16 19-20; 17-18 21-22

3 isotopic lines drawn for 1st telescope of each group
Same grid "scaled" to data for each telescope in group



Manual scaling*
X (CsI) / Y (Si)

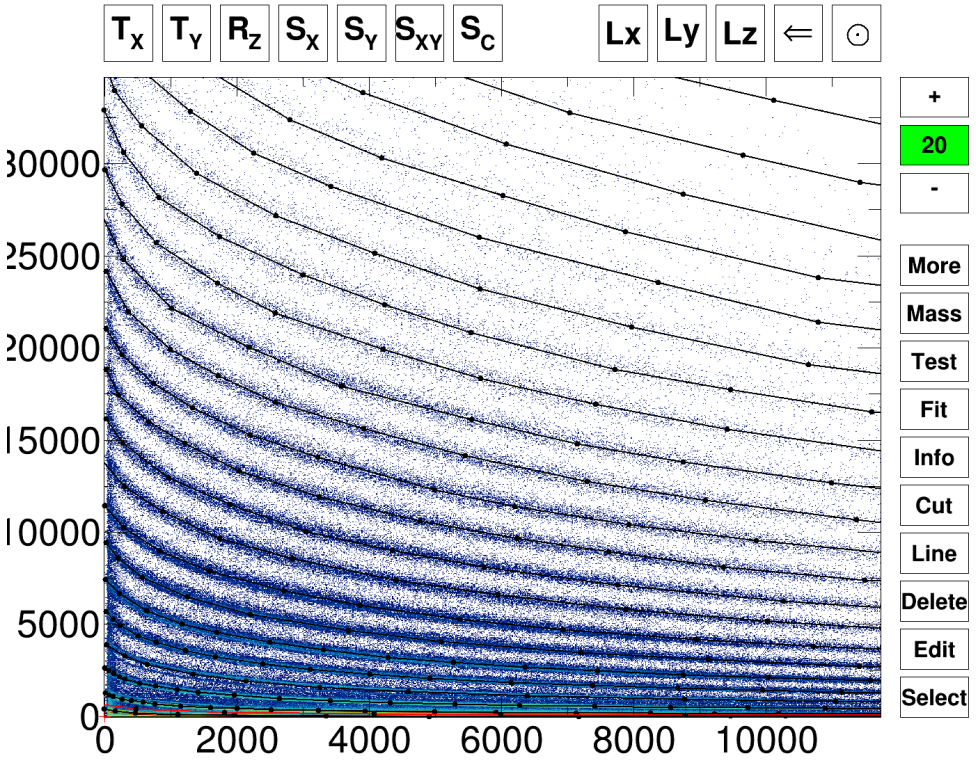


***New KaliVeda feature:**
Cumulative scaling factors automatically saved in file
`KVIDGridEditor_scalings.dat`

Scaling of *ΔE-E* matrices

Telescope groups [same/similar Si thickness]:
Rings 6/7: 1-6 21-22; 7-10; 11-14*; 15-20; 23-24 *(0712 did not scale)
Rings 8/9: 1-2 9-10; 3-6; 7-8 11-14 23-24; 15-16 19-20; 17-18 21-22

Scalings used to define new ‘calibrated’ parameters:




```
# Scalings for SI-CSI identification E884 Rings 7
SignalIn:                                TotLight
SignalOut:                               TotLight_ID_SCALED
CalibType:                               ID-Scaling
CalibOptions:                            func=pol1,min=0,max=65535
RunList:                                 5-14
CSI_0702:                                0. 1.15143
CSI_0703:                                0. 0.919304
CSI_0704:                                0. 0.79552
...
```

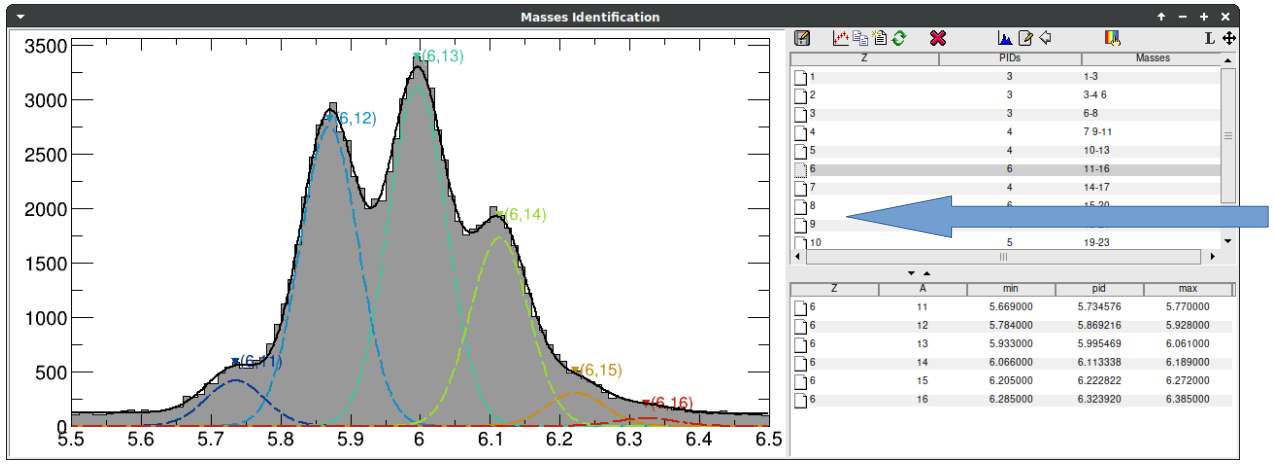
Matrices filled using scaled parameters
- maximise statistics for each group to:
  → *go as high as possible in Z (21~23)*
  → *identify as many isotopes as possible*

E884 : INDRA Si-CsI identifications

John Frankland

- Scaling of *ΔE-E* matrices
- Identification of fragments (Z≥2)
- Identification of H isotopes
- Data quality audit

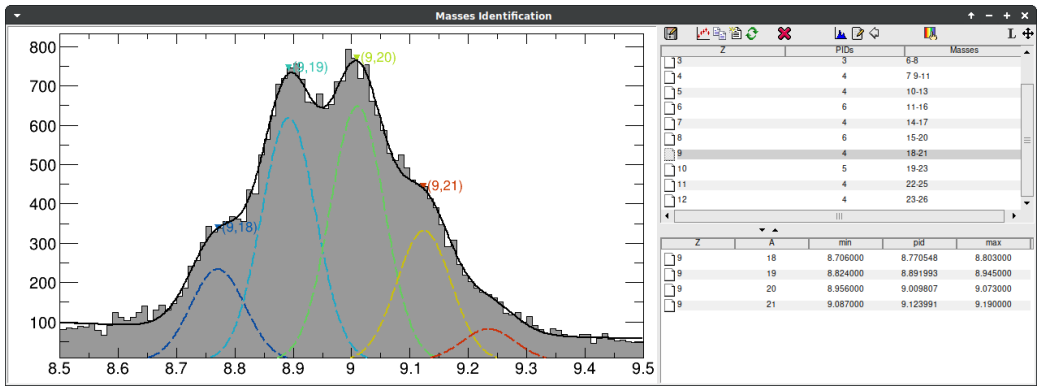
Z & *A* identification from *ΔE-E* matrices

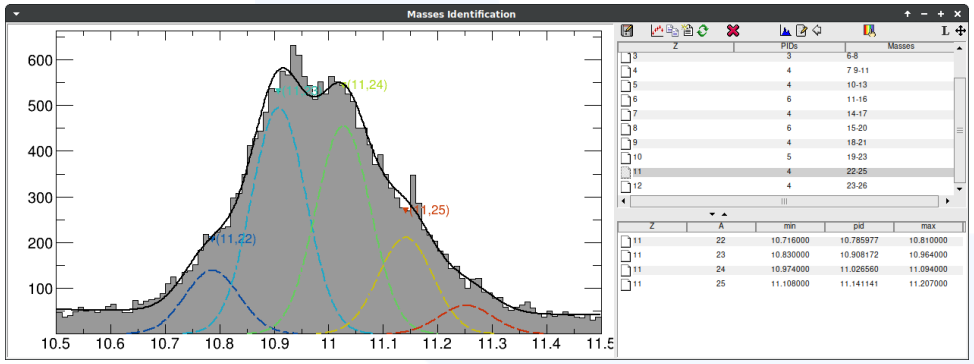


Isotopic distributions extracted with multi-gauss fits

Isotopic identification up to at least *Z=6* is achieved for all telescopes of all rings;

In the best cases, up to *Z=10, 11, 12(???)*



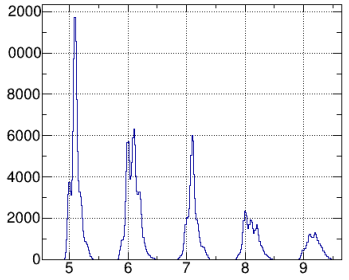


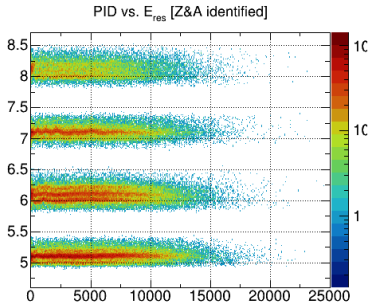
Z & *A* identification from *ΔE-E* matrices

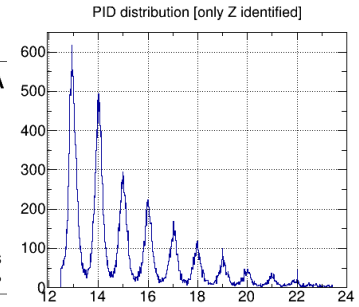
Data: ^{70}Zn+^{70}Zn@34.8AMeV (runs 5-14)

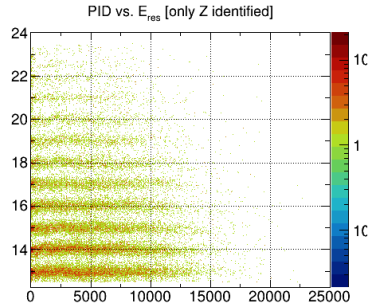
Ring 6 (1-6;21-22)

<θ>=17°



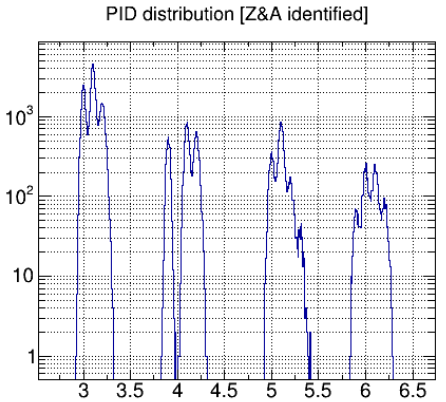


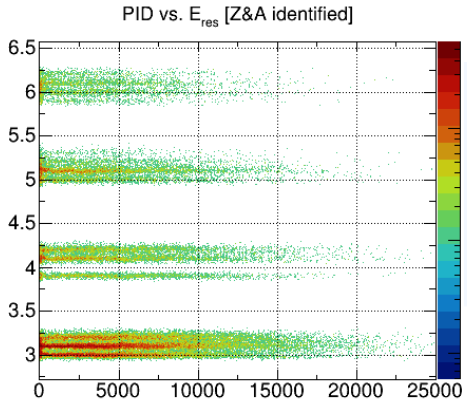


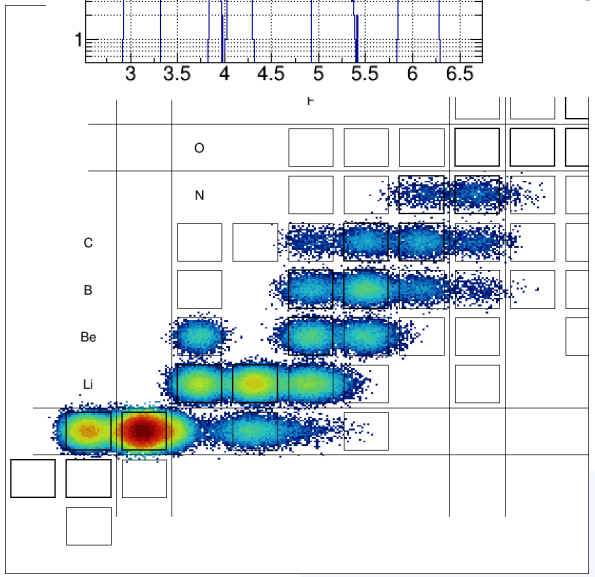


Ring 9 (1-2;9-10)

<θ>=39°





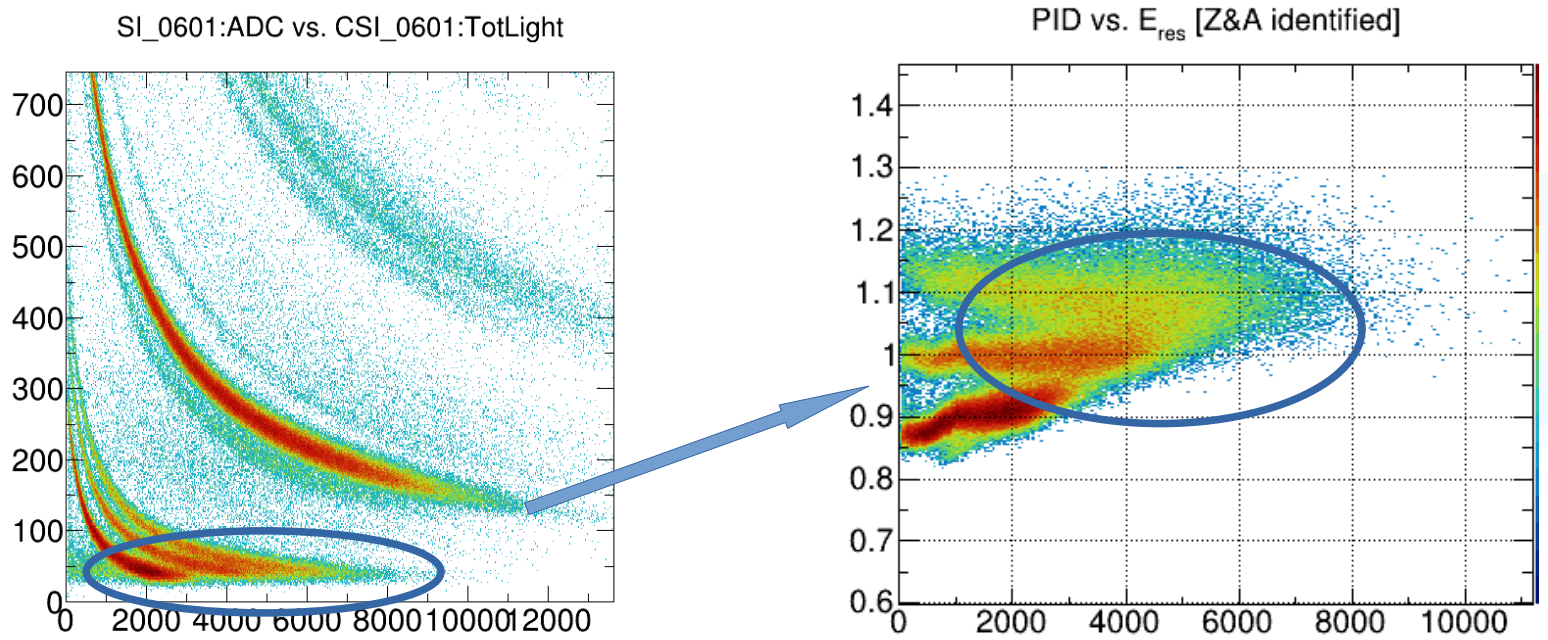


E884 : INDRA Si-CsI identifications

John Frankland

- Scaling of *ΔE-E* matrices
- Identification of fragments (Z≥2)
- Identification of H isotopes
- Data quality audit

p,d,t identifications

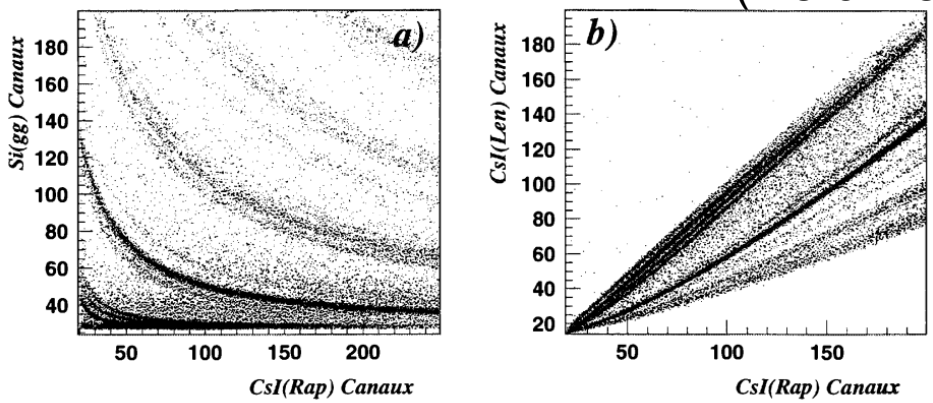


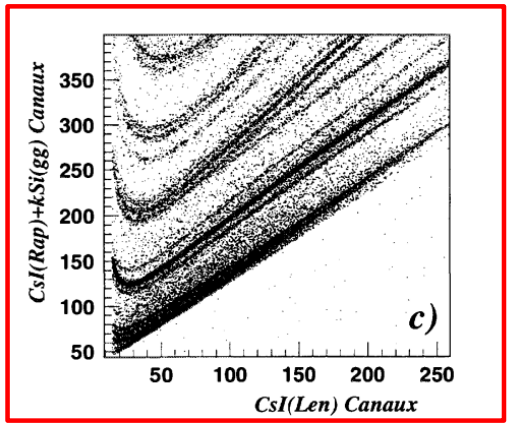
Hydrogen isotope lines are truncated → silicon thresholds
Bad identification → *p,d,t* “merge” at high energies

p,d,t identifications

Solution→ Use combination of
Si and CsI-Fast signals

(merci Pepe!)



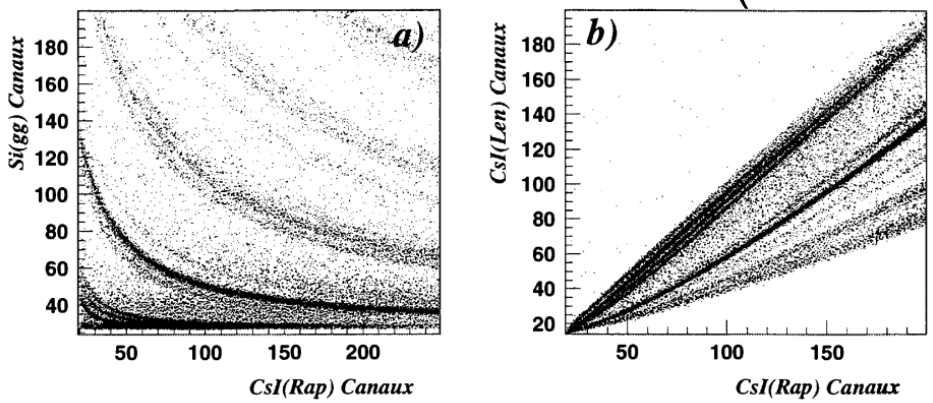


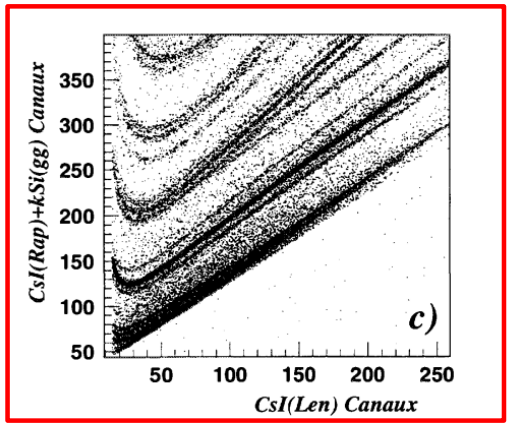
J. Benlliure, Ph.D thesis (1995)
University of Valencia/GANIL
https://theses.hal.science/in2p3-00010208v1

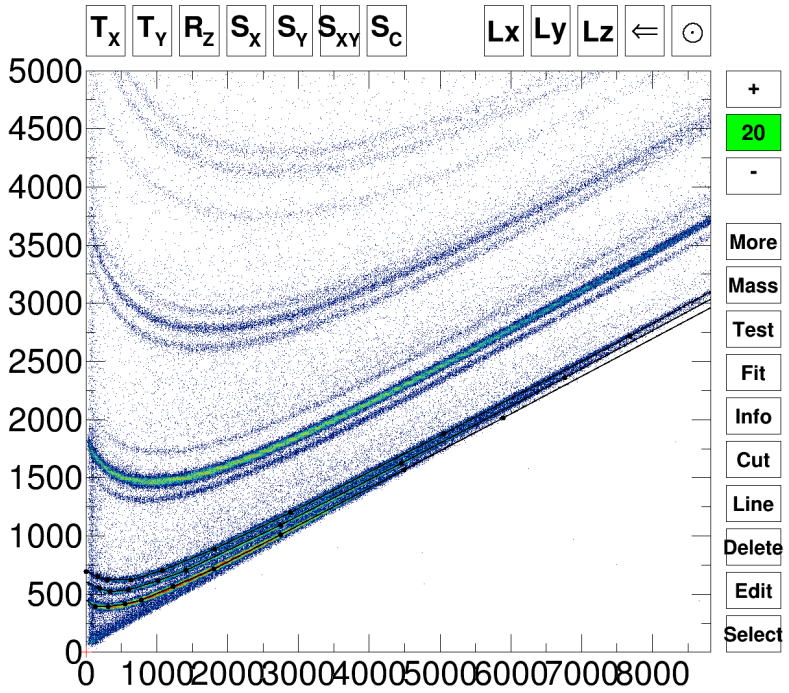
p,d,t identifications

Solution→ Use combination of
Si and CsI-Fast signals

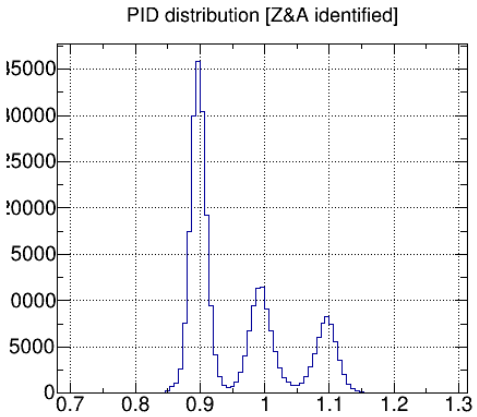
(merci Pepe!)

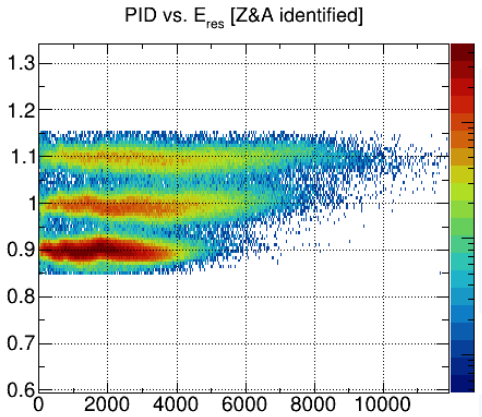






p,d,t identification matrices using (unscaled) Si_ADC+CsI_R vs. TotLight
→ 1 per telescope





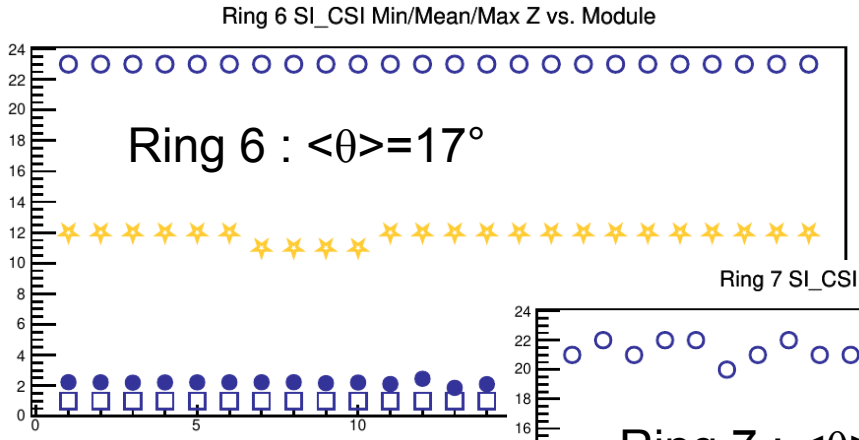
J. Benlliure, Ph.D thesis (1995)
University of Valencia/GANIL
https://theses.hal.science/in2p3-00010208v1

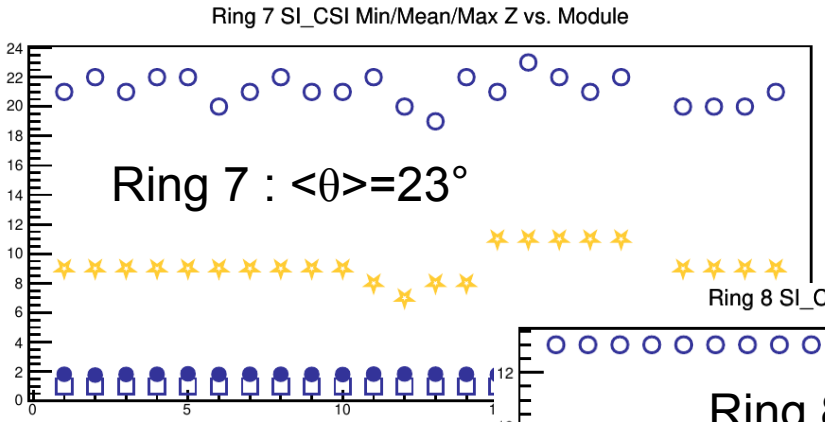
E884 : INDRA Si-CsI identifications

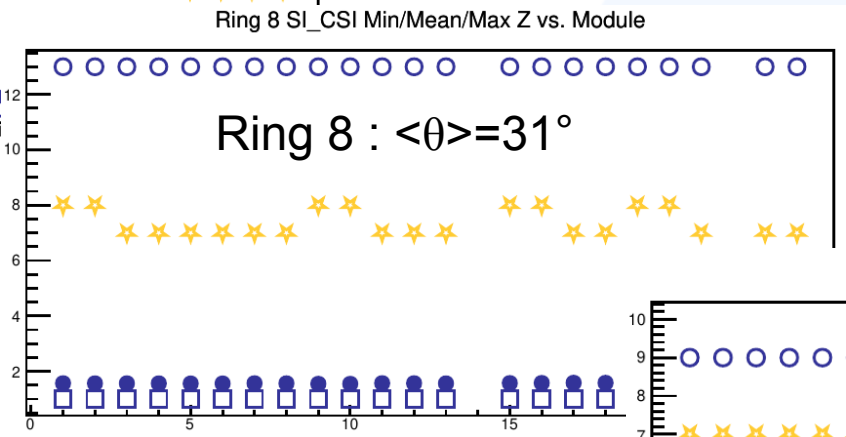
John Frankland

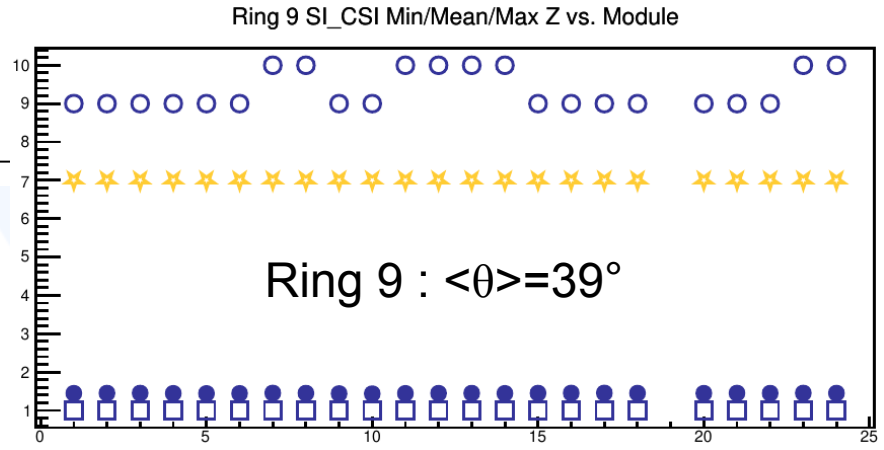
- Scaling of *ΔE-E* matrices
- Identification of fragments (Z≥2)
- Identification of H isotopes
- Data quality audit

Data quality audit reports for runs 5-14 (^{70}Zn+^{70}Zn@34.8AMeV)









Min. Z Mean Z

Max. Z with identified A Max. Z

KaliVedaGUI:
Analysis task → Prepare data quality audits
→ DataQualityAudit.root

```
$ kaliveda DataQualityAudit.root
kaliveda[0] KVDataQualityAuditReporting_INDRAFAZIA DQA("70Zn70Zn", "E884")
Kaliveda[1] DQA.do_report() → PDF file
```

Summary & outlook

- E884 INDRA Si-CsI identifications implemented for rings 6-9:
- → 4 x 5 groups of ‘scaled’ data for Z>1 fragments
- → (Si+CsI-R) vs. CsI-Light for Z=1 (p,d,t) x 96

Summary & outlook

- E884 INDRA Si-CsI identifications implemented for rings 6-9:
- → 4 x 5 groups of ‘scaled’ data for Z>1 fragments
- → (Si+CsI-R) vs. CsI-Light for Z=1 (p,d,t) x 96

- All done for runs 5-14 (^{70}Zn+^{70}Zn@34.8AMeV)

- TO DO:
- → runs 15-23 (^{70}Zn+^{70}Zn@34.6AMeV)
- → runs 26-43 (^{70}Zn+^{209}Bi@34.6AMeV)
- → runs 44-49 (^{70}Zn+^{27}Al@34.6AMeV)

Summary & outlook

- E884 INDRA Si-CsI identifications implemented for rings 6-9:
- → 4 x 5 groups of ‘scaled’ data for Z>1 fragments
- → (Si+CsI-R) vs. CsI-Light for Z=1 (p,d,t) x 96

- All done for runs 5-14 (^{70}Zn+^{70}Zn@34.8AMeV)

- TO DO:
- → runs 15-23 (^{70}Zn+^{70}Zn@34.6AMeV)
- → runs 26-43 (^{70}Zn+^{209}Bi@34.6AMeV)
- → runs 44-49 (^{70}Zn+^{27}Al@34.6AMeV)

Should be fast!

→ INDRA silicons VERY stable during campaign

→ just need to check that nothing moved, and do Gaussian multi-fit for each system/reaction

Merci pour votre attention