

Study of asymmetry dependence  
of valence-nucleon correlations probed via  
single nucleon transfer from  $^{18}\text{Ne}$

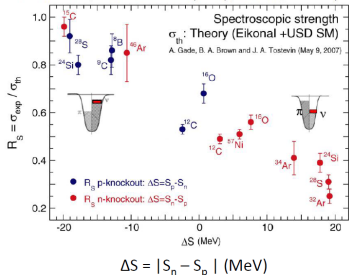
- E655S -

Spokepersons: A. Gillibert, F. Flavigny

Matthieu Sénoville

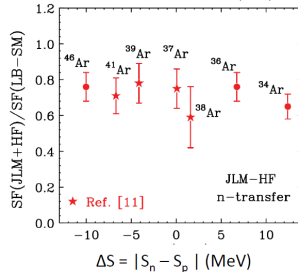
CEA-Saclay, Irfu/SPhN, F-91190 Gif-sur-Yvette cedex, France

A. Gade et al, PRL, **93** 042501 (2004); PRC **77**, 044306 (2008)



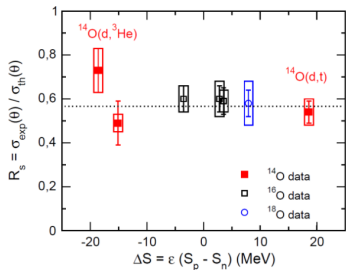
- Intermediate-energy knockout (-1n) et (-1p)
- Disagreement between theory and experiment

J. Lee et al., PRC 83, 014606 (2001)



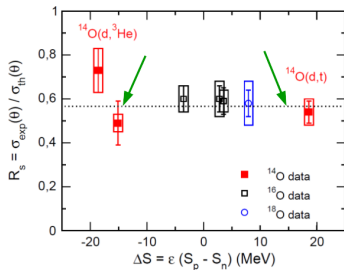
- Low energy transfer (d,p)
- Data up to  $\Delta S = 13$  MeV

E569S :  $^{14}\text{O}(d,t)$ ,  $(d,^3\text{He})$  and elastic scattering, 19 MeV/nucleon, SPIRAL (GANIL),  $\Delta S \sim 18.5$  MeV



F. Flavigny *et al.*, Phys. Rev. Lett. **110**, 122503 (2013)

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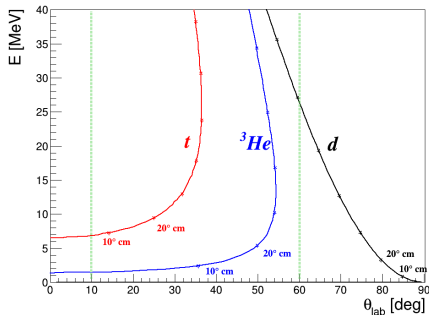


F. Flavigny *et al.*, Phys. Rev. Lett. **110**, 122503 (2013)

$^{18}\text{Ne} \longrightarrow \Delta S = 15.3$  MeV

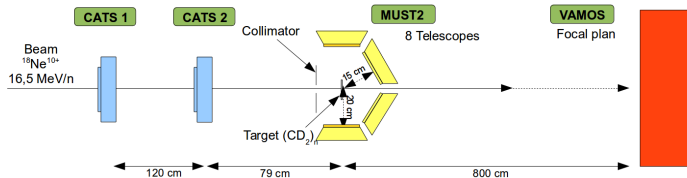
E655S : spokespersons A Gillibert, F. Flavigny

$^{18}\text{Ne}(d,t)$ ,  $(d,^3\text{He}) \longrightarrow$  Similar to E569S exp.

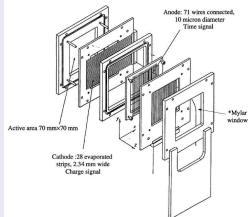


CD<sub>2</sub> targets : 3, 0.5 and 1.5 mg.cm<sup>-2</sup>

Reactions : (d,t), (d,<sup>3</sup>He) and (d,d)

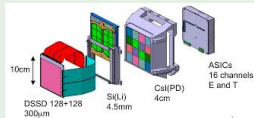


## CATS



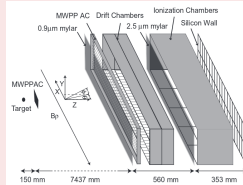
- Beam reconstruction on target
- Start time of flight

## MUST2

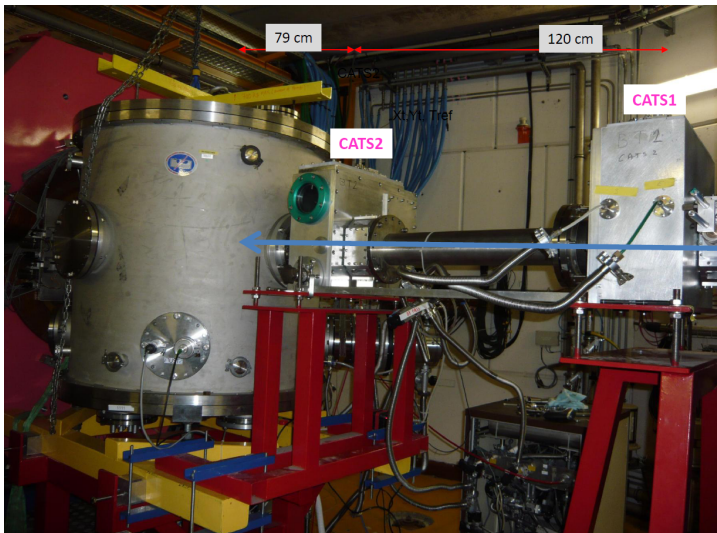


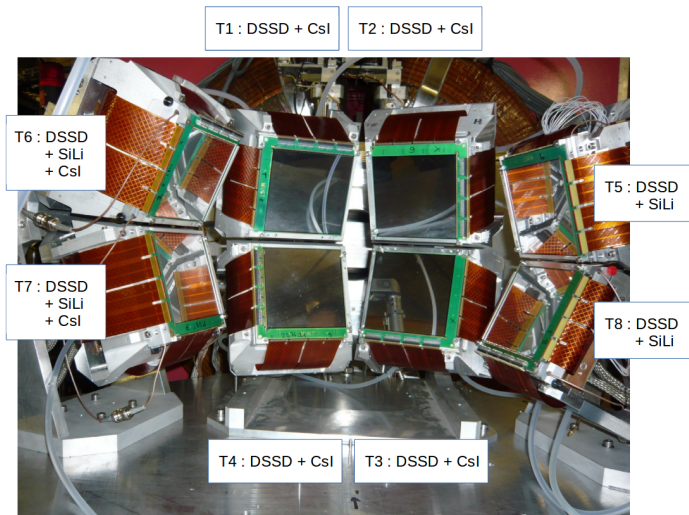
- E, T measurement
- Identification :  $\Delta E$ -T and  $\Delta E$ -E
- $(x,y,z) \rightarrow \theta$

## VAMOS



- Acceptance : 4.5 deg

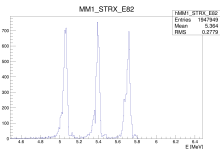






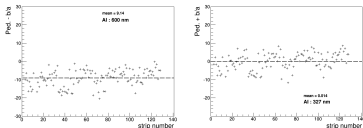
## DSSD Calibration

- 3  $\alpha$  source :  $^{239}\text{Pu}$ ,  $^{241}\text{Am}$ ,  $^{244}\text{Cm}$   
(5.15, 5.48, 5.80 MeV)



FWHM resolution  $\sim 38$  keV

- Al equivalent dead layer thickness  
→ zero extrapolation method

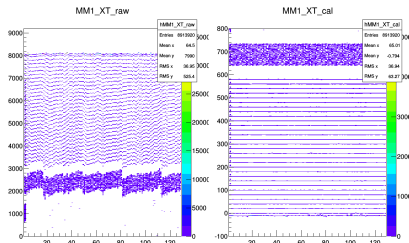


## CsI Calibration

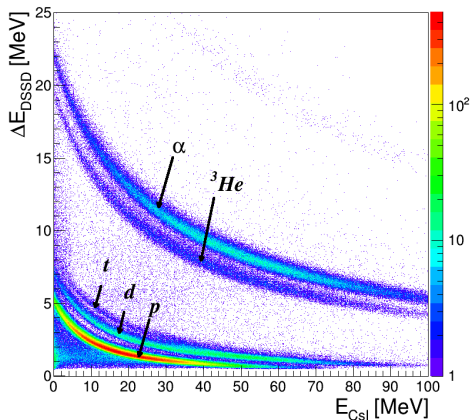
- $E = f(\Delta E)$

## Time Calibration

- Time Calibrator module  
→ CALIMERO



➤  $\Delta E - E$

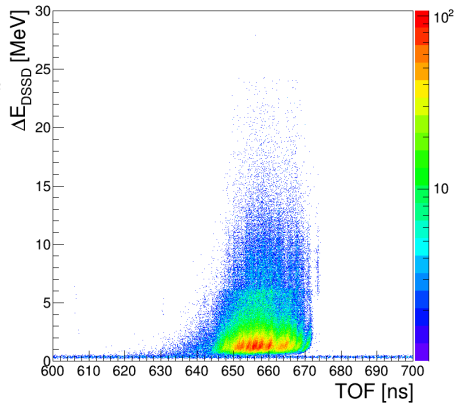


➤  $\Delta E - TOF$

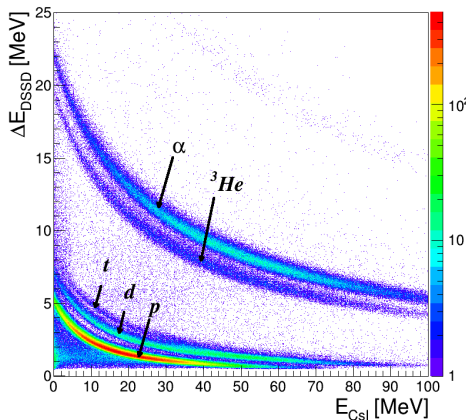
$$TOF[ns] = a \times TOF[channel] + b$$

a : from CALIMERO

b : from CALIMERO



➤  $\Delta E - E$

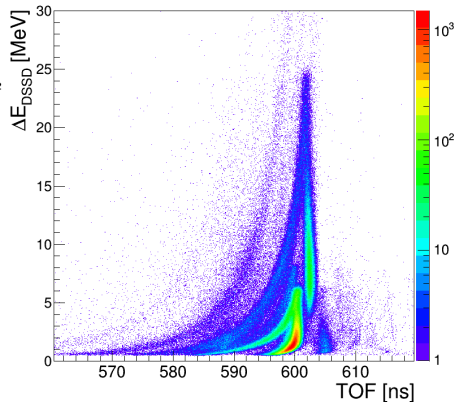


➤  $\Delta E - TOF$

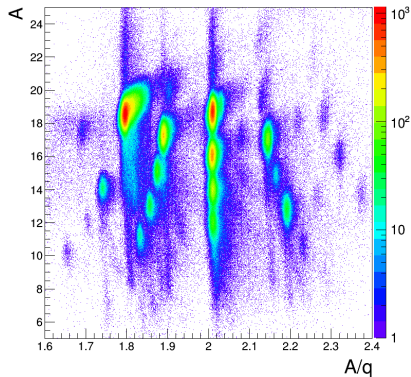
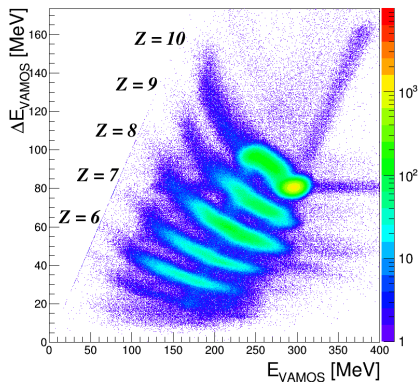
$$TOF[ns] = a \times TOF[channel] + b$$

a : from CALIMERO

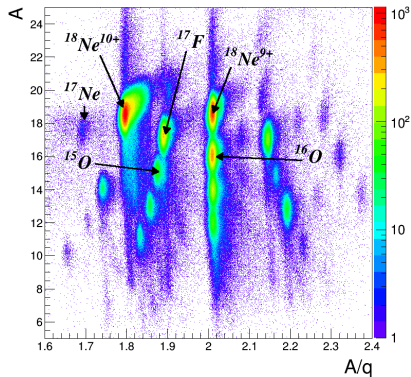
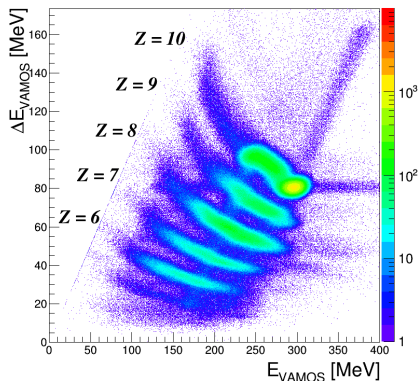
b : from punch-through events

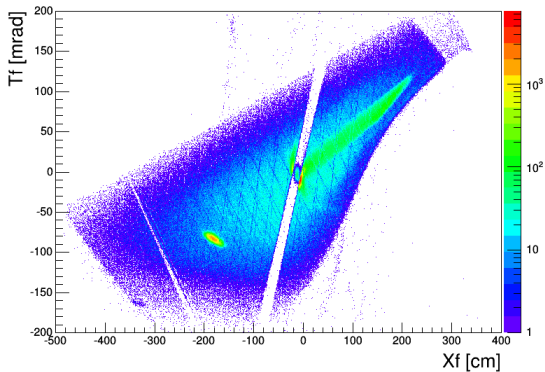


- Drift Chamber → Angle, Position
- Ionisation Chamber → Energy Loss
- Plastic → TOF, Energy

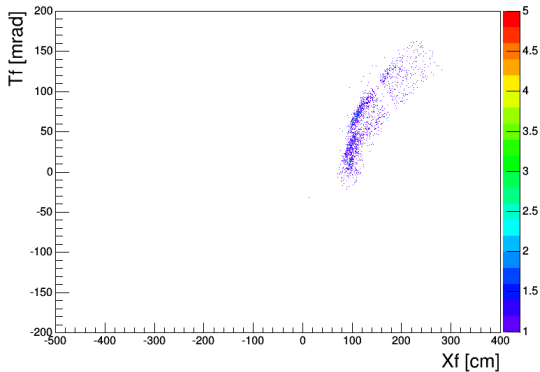


- Drift Chamber → Angle, Position
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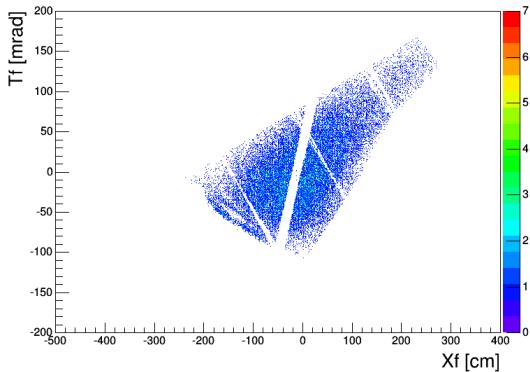




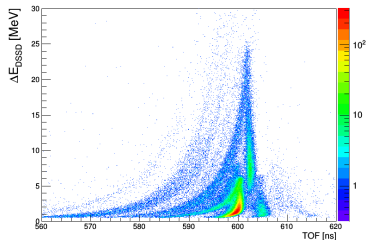
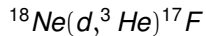
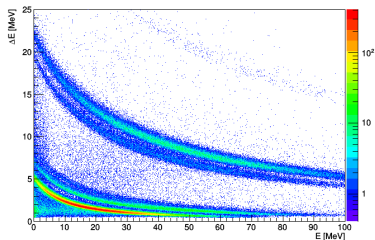
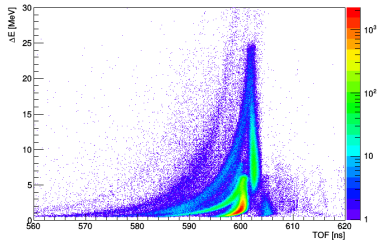
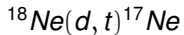
➤  $^{17}\text{Ne}$  in VAMOS

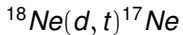


➤  $^{17}\text{F}$  in VAMOS

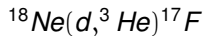
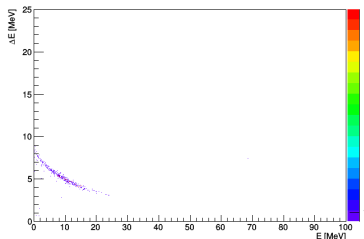
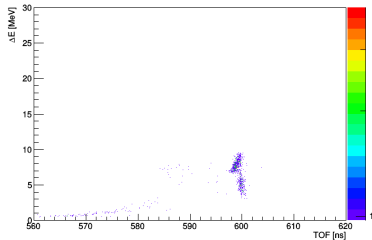




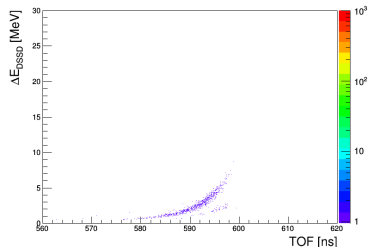


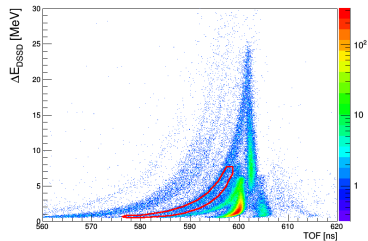
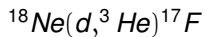
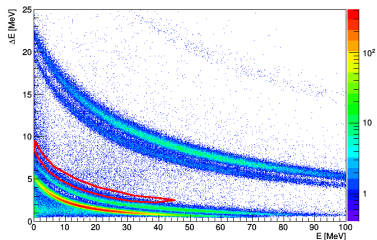
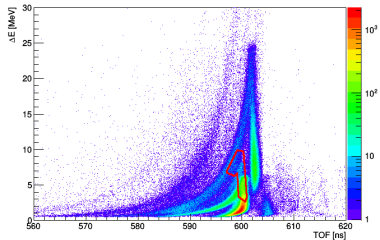
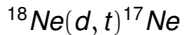


$^{17}\text{Ne}$  + transfer in Tf vs Xf

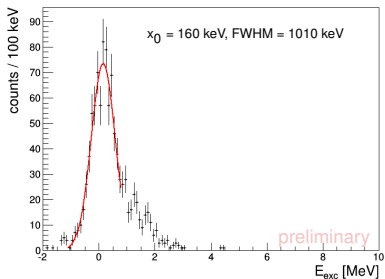
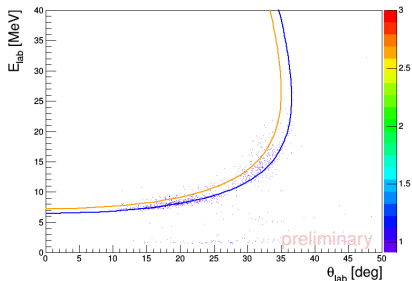


$^{17}\text{F}$  + transfer in Tf vs Xf





➤  $^{17}\text{Ne}$  in VAMOS +  $t$  in MUST2



6,46  
 $^{16}\text{O} + ^3\text{He}$

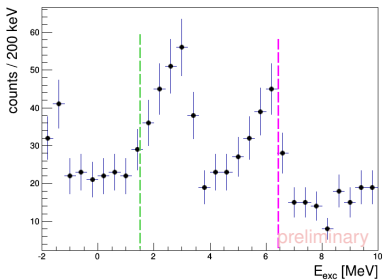
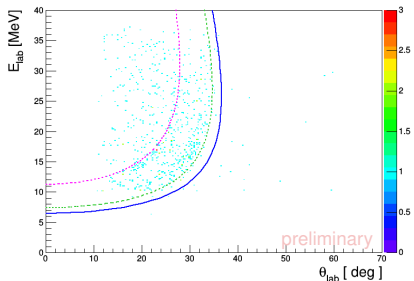
1,50  
 $^{16}\text{F} + p$

1,29  $3/2$

gs  $1/2$

$^{17}\text{Ne}$

➤  $^{15}\text{O}$  in VAMOS +  $t$  in MUST2



6,46  
 $^{14}\text{O} + ^3\text{He}$

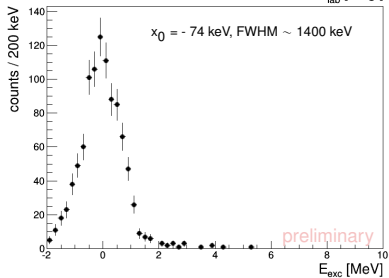
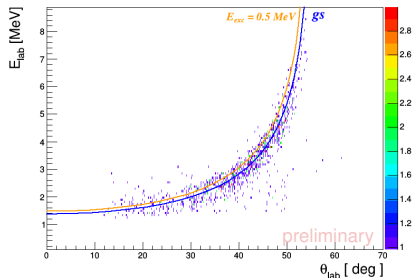
1,50  
 $^{16}\text{F} + p$

1,29      3/2

gs      1/2

$^{17}\text{Ne}$

➤  $^{17}\text{F}$  in VAMOS +  $^3\text{He}$  in MUST2



5,81  
 $^{15}\text{N} + ^4\text{He}$

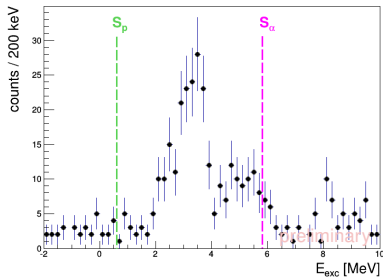
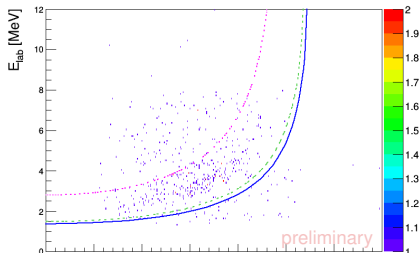
0,60  
 $^{16}\text{O} + \text{p}$

0,50  $1/2^+$

gs  $5/2^+$

$^{17}\text{F}$

➤  $^{16}\text{O}$  in VAMOS +  $^3\text{He}$  in MUST2



5,81  
 $^{13}\text{N} + ^4\text{He}$

0,60  
 $^{16}\text{O} + p$

0,50	1/2 <sup>+</sup>
gs	5/2 <sup>+</sup>

$^{17}\text{F}$

- Fitting of excited states positions
- Angular distributions
- Extraction of cross sections
  
- Beam tracking and target impact position
  
  
- (d,d) analysis



## PREPARATION

*MUST2 Mounting* : L. Ménager, P. Gangnant

*BTD CATS* : J. Pancin, S. Damoy, T. Roger

*Detectors of VAMOS area* : Johan Goupil, Vincent Morel

*CC CAEN* : J. Cacitti

*Acquisition - hardware* : Charles Houarner, + *soft* : F. Saillant, G. Lebertre, L. Légeard

*Beam tuning* : B. Jacquot

## SHIFTS

*IKS Leuven, IPNO* : F. Flavigny (**sp**)

*SPhN team* : A. Gillibert (**sp**) , V. Lapoux, E. Pollacco, S. Boissinot, A. Corsi, L. Audirac

*IPN Orsay* : S. Franchoo, F. Hammache, B. Le Crom, P. Morfouace

*GANIL* : B. Bastin, F. Boulay, A. Lemasson, M. Rejmund, T. Roger

*LPC Caen* : J. Gibelin