

# Transfer reaction experiments using deuterated isobutene gas in active targets

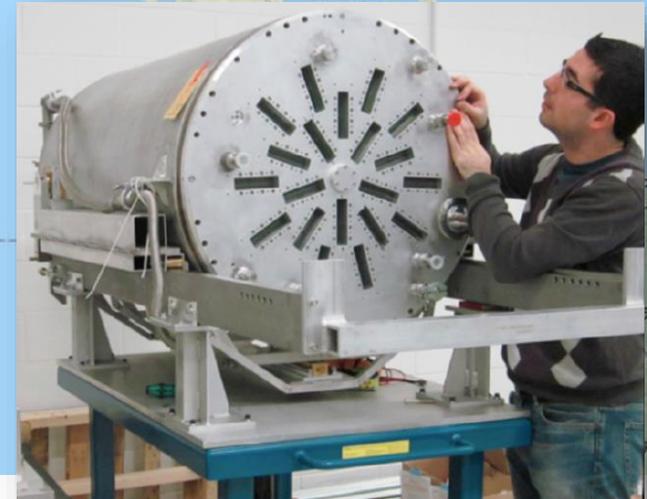
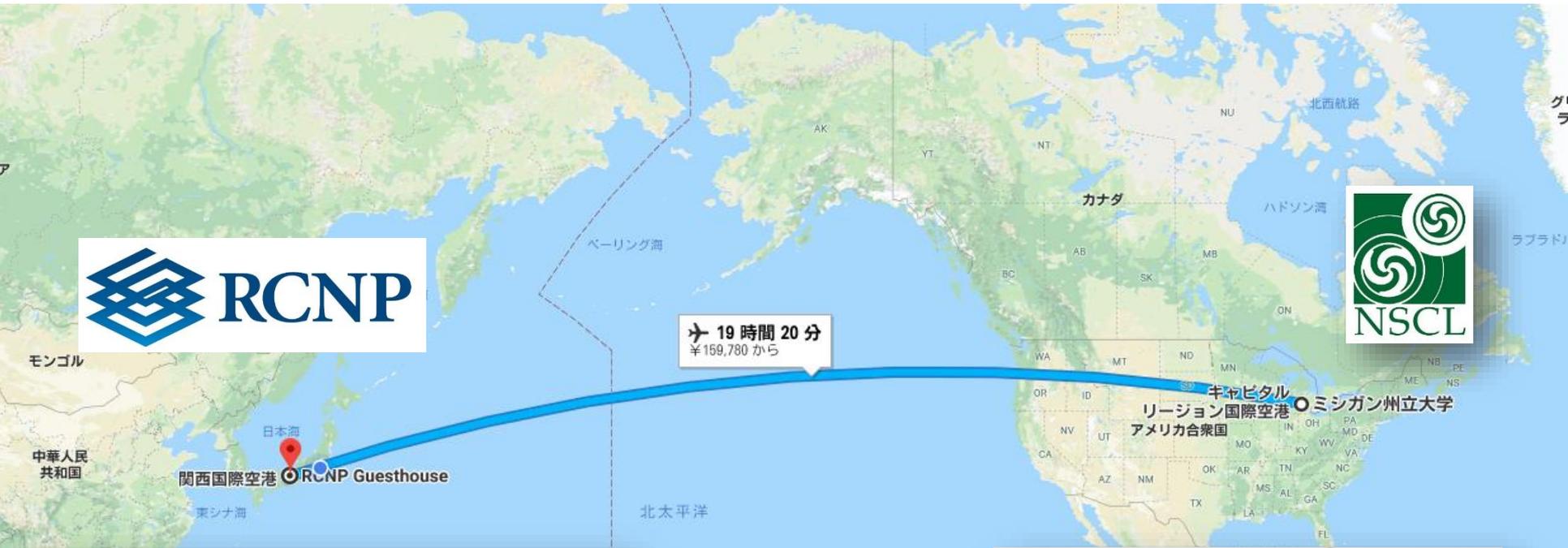
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# AT-TPC will come to RCNP (Osaka)!



# Accelerator facility of RCNP

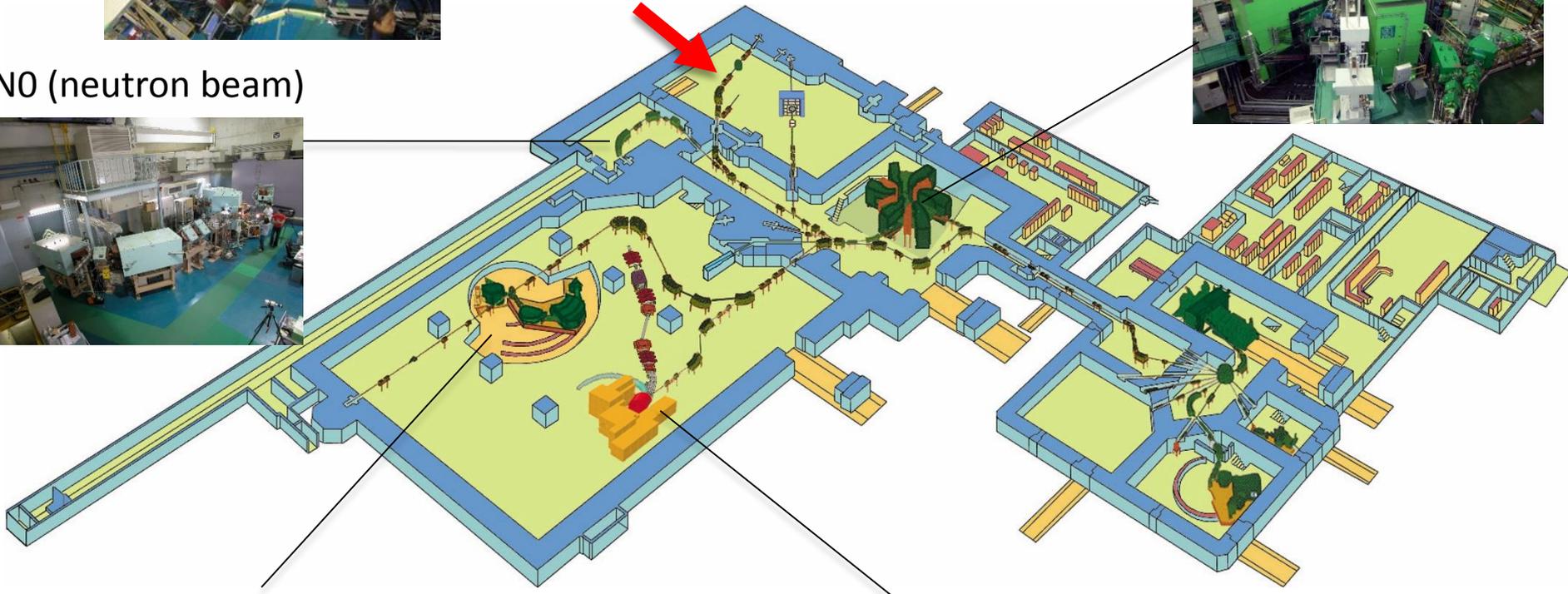
K400 ring cyclotron



EN course  
(RI beam)



N0 (neutron beam)



Grand Raiden and LAS spectrometers

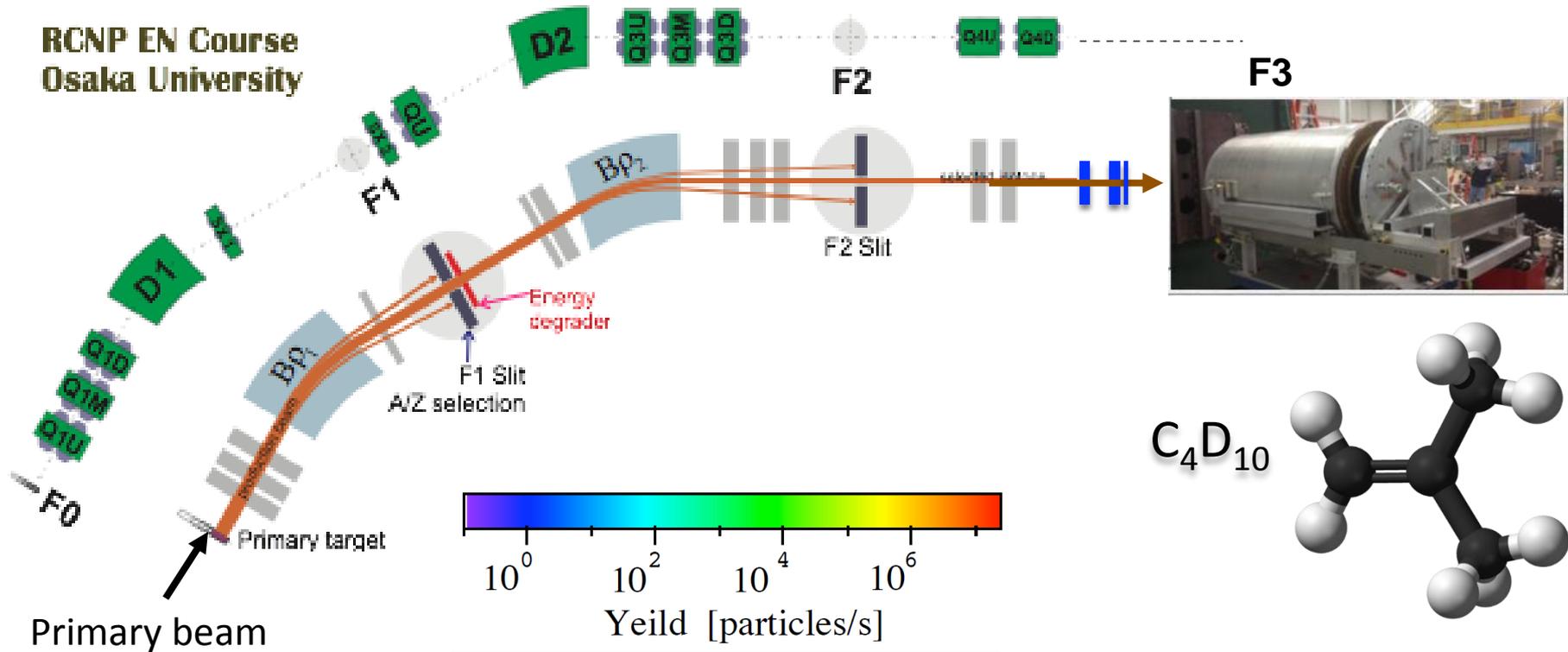


MuSIC (DC muon beam)



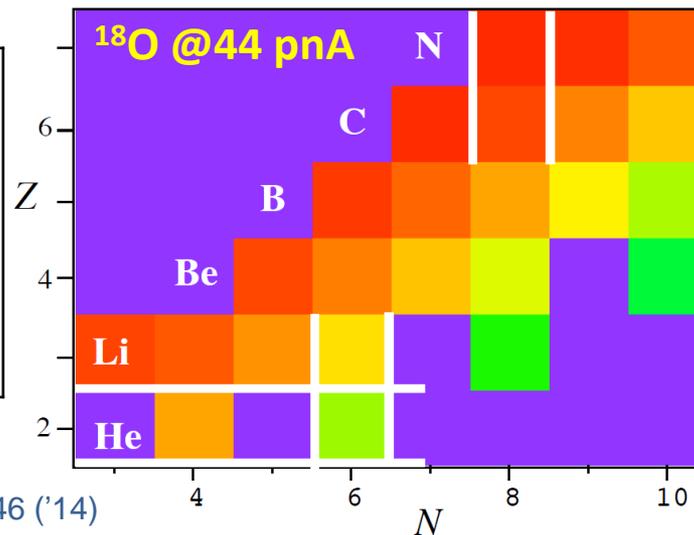
# EN course: RI beam via fragmentation

RCNP EN Course  
Osaka University



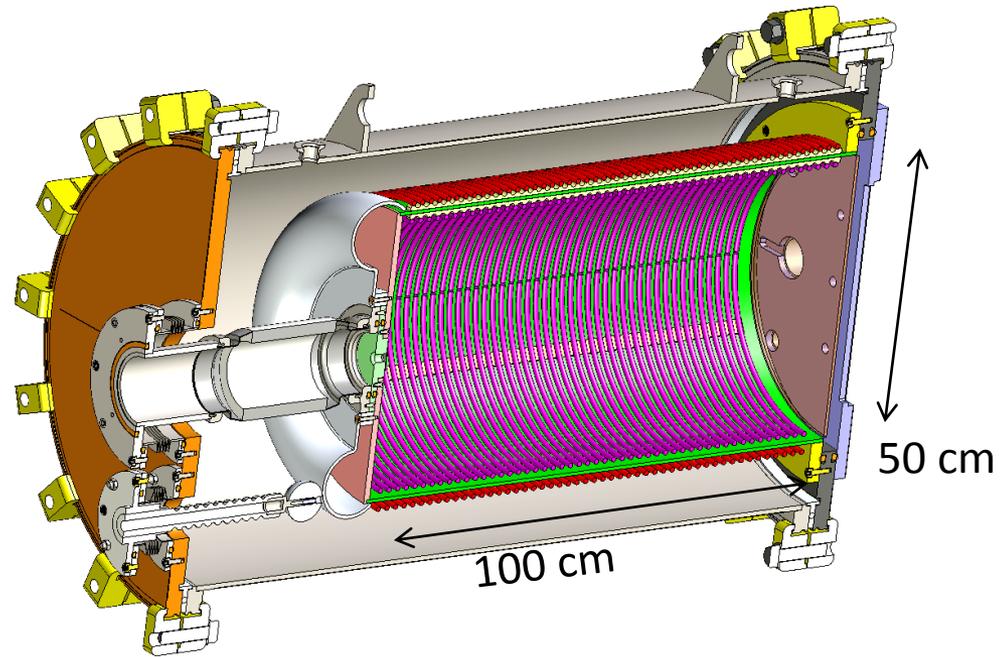
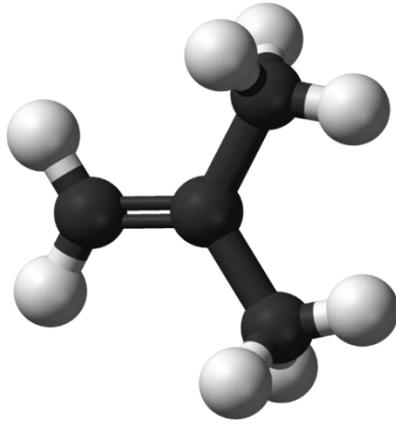
Max $B\rho$	3.2 Tm
$\Delta p/p$	$\pm 4\%$
$\Delta\theta$	40 mrad
$\Delta\phi$	28 mrad
Dispersion	17.32 mm/%

T. Shimoda, NIM B70, 320 ('92)  
S. Mitsuoka, NIM A372, 489 ('96)  
H.J. Ong, AIP Conf. Proc. 1588, 146 ('14)



	Energy [MeV/u]	Intensity [pnA]	Date
$^{12}\text{C}$	50	300	Dec-14
$^{12}\text{C}$	100	50	Jun-16
$^{13}\text{C}(6+)$	60	100	May-14
$^{18}\text{O}(8+)$	60	125	Apr-15
$^{22}\text{Ne}(10+)$	80	45	Jun-14
$^{40}\text{Ar}(17+)$	51.5	5.3	May-15

# Deuterated isobutene for active target



- High deuteron density

1 atm  $\rightarrow$  equiv.  $D_2$  @ 5 atm

10 cm \* 1 atm  $\rightarrow 2.5 \times 10^{21}$  D/cm<sup>2</sup>  $\rightarrow$  equiv. 33 mg/cm<sup>2</sup> of  $CD_2$

High luminosity (roughly one order of magnitude)

- High stopping power

25 cm  $\rightarrow$  proton  $\sim 5$  MeV

Both ( $d,p$ ) and ( $d,^3He$ ) reactions

# Timeline

	2018/ 10	2019/ 1	2019/ 4	2019/ 7	2019/ 10	2020/ 1	2020/ 4	2020/ 7
<b>Machine Time</b>		Jan.					??	
<b>Accelerator Shutdown</b>								??
<b>EN Q installation</b>								
<b>Project PAC</b>	Dec.		Apr.					
<b>Beam-time PAC</b>				Aug.		Feb.???		

- RCNP will be shutdown at least one year from February.
- At least, one B-PAC for proposals in 2019.
- Active target workshop at RCNP planned in autumn 2019 (likely at the end of Nov.).



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