

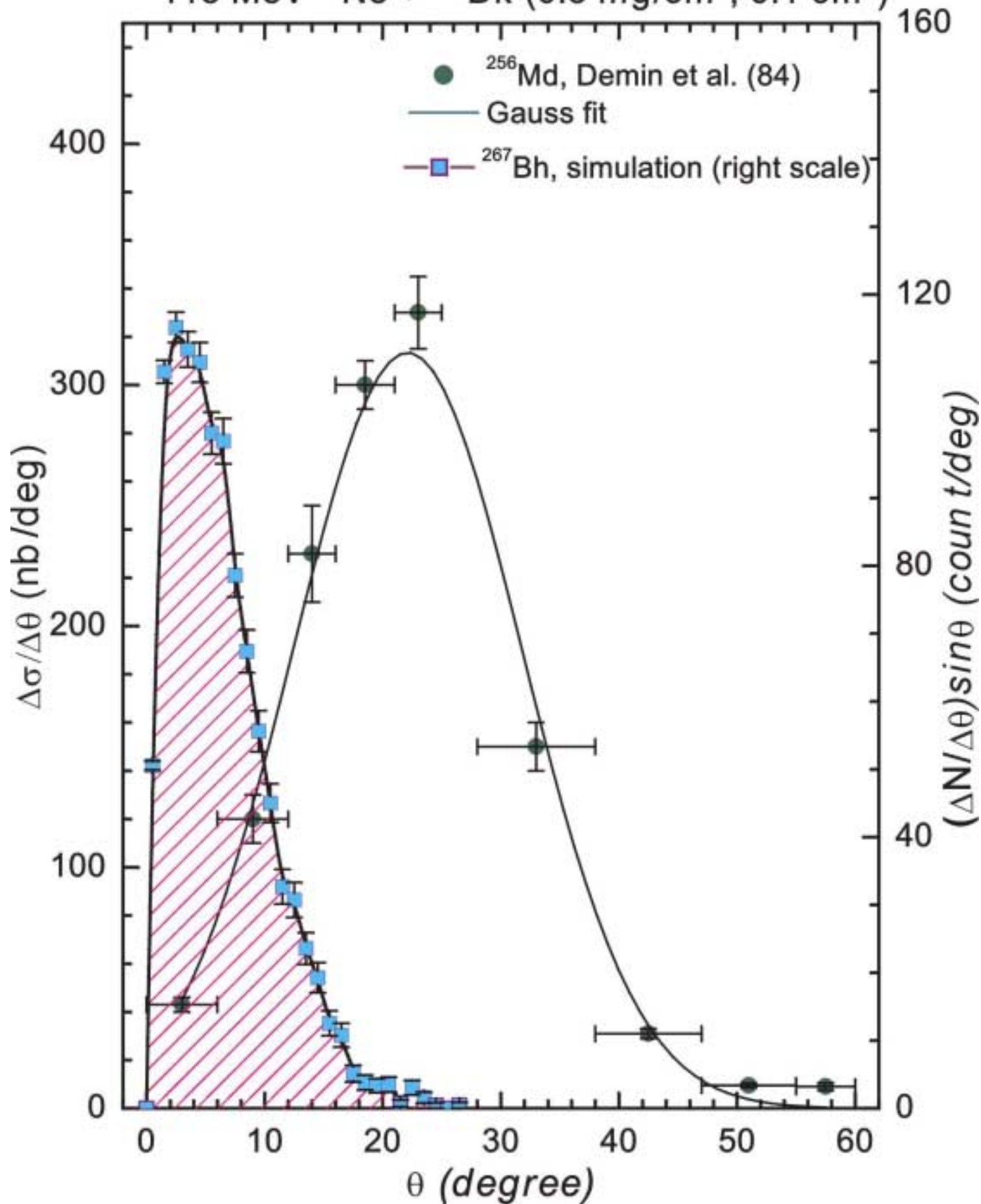
Angle- and energy- selection of the heaviest evaporation residues produced in complete fusion reactions

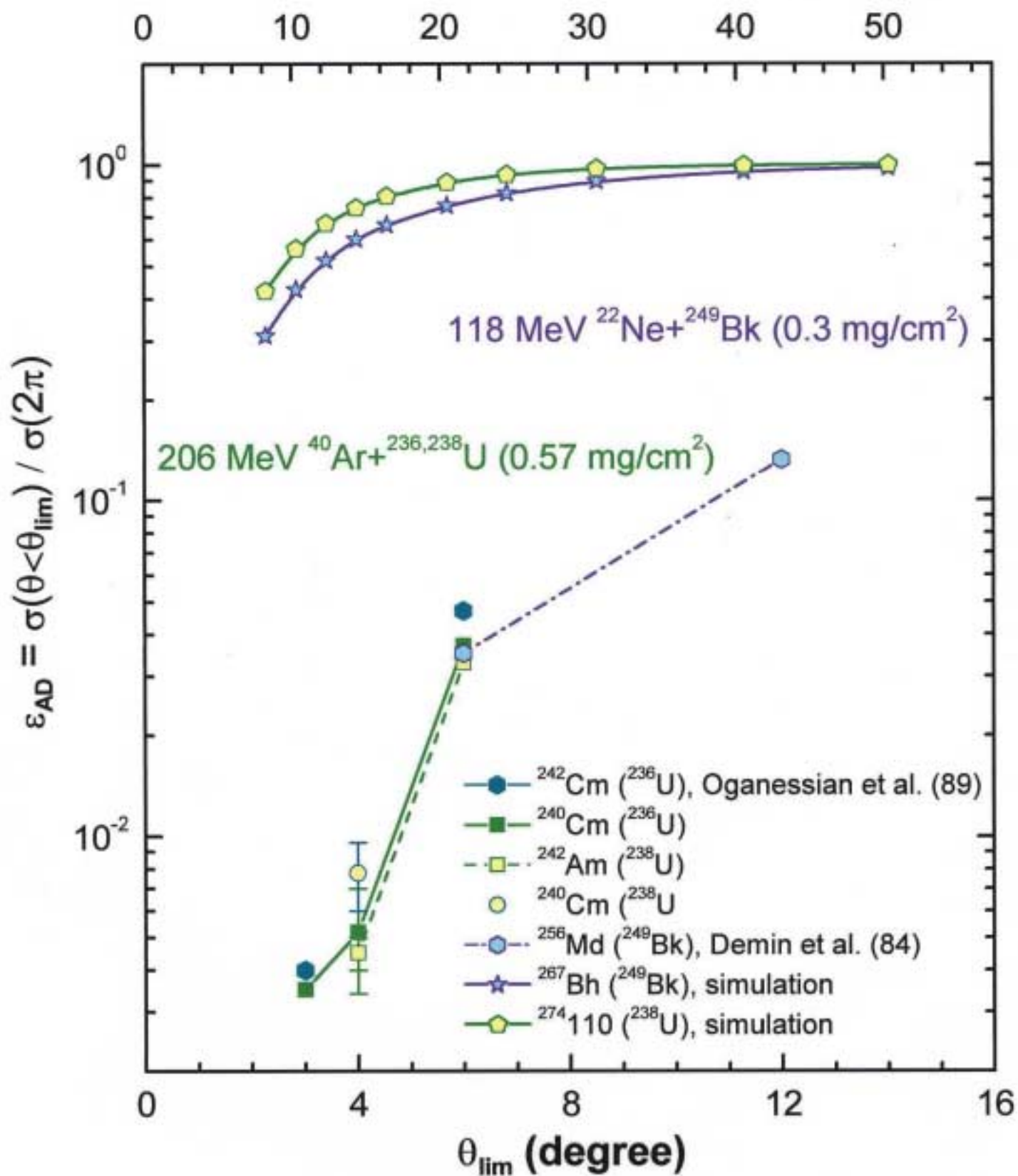
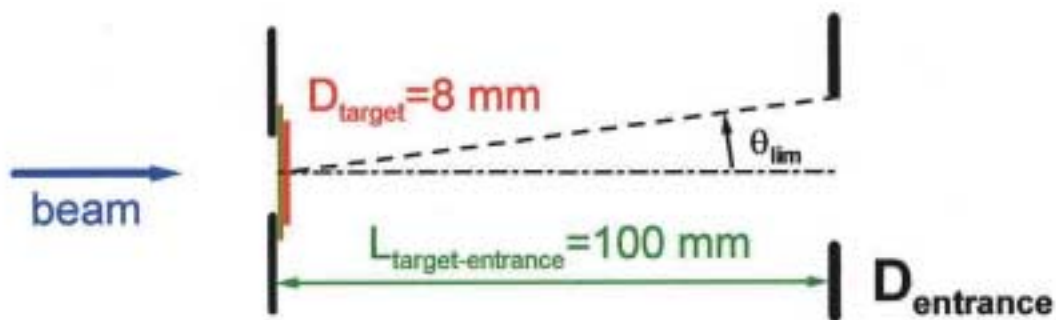
R.N. Sagaidak

Flerov Laboratory of Nuclear Reactions, JINR, Dubna, Russia

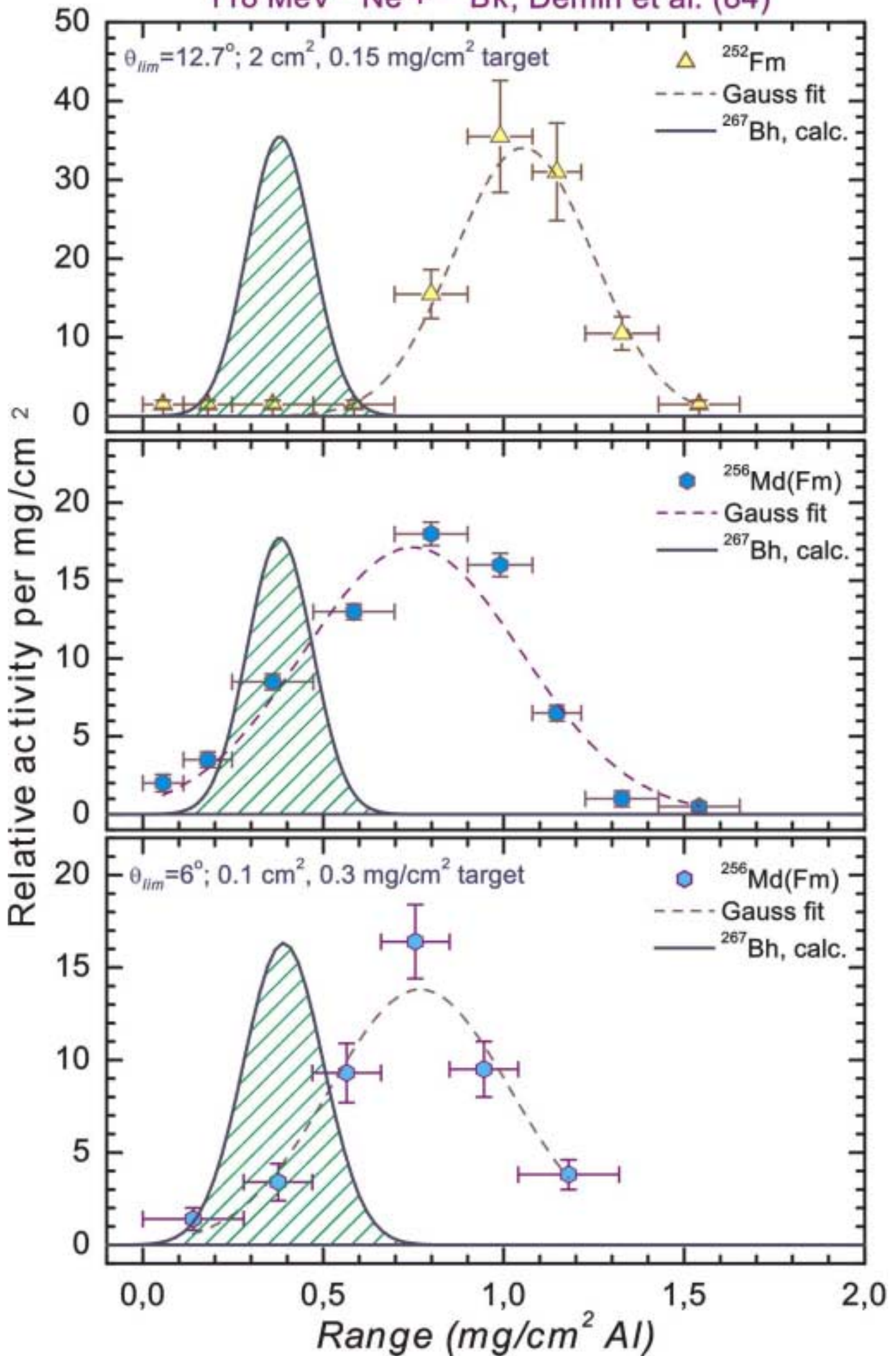
- **Angular distributions for ER and target-like transfer products**
- **Range distributions for ER and target-like transfer products measured in the beam direction**
- **Applications to the selection of $^{288}114$ produced in the $^{48}\text{Ca} + ^{244}\text{Pu}$ reaction**
- **Validity of applications (straggling, angular distributions, ranges, model experiments, etc.)**

118 MeV $^{22}\text{Ne} + ^{249}\text{Bk}$ ($0.3 \text{ mg/cm}^2, 0.1 \text{ cm}^2$)

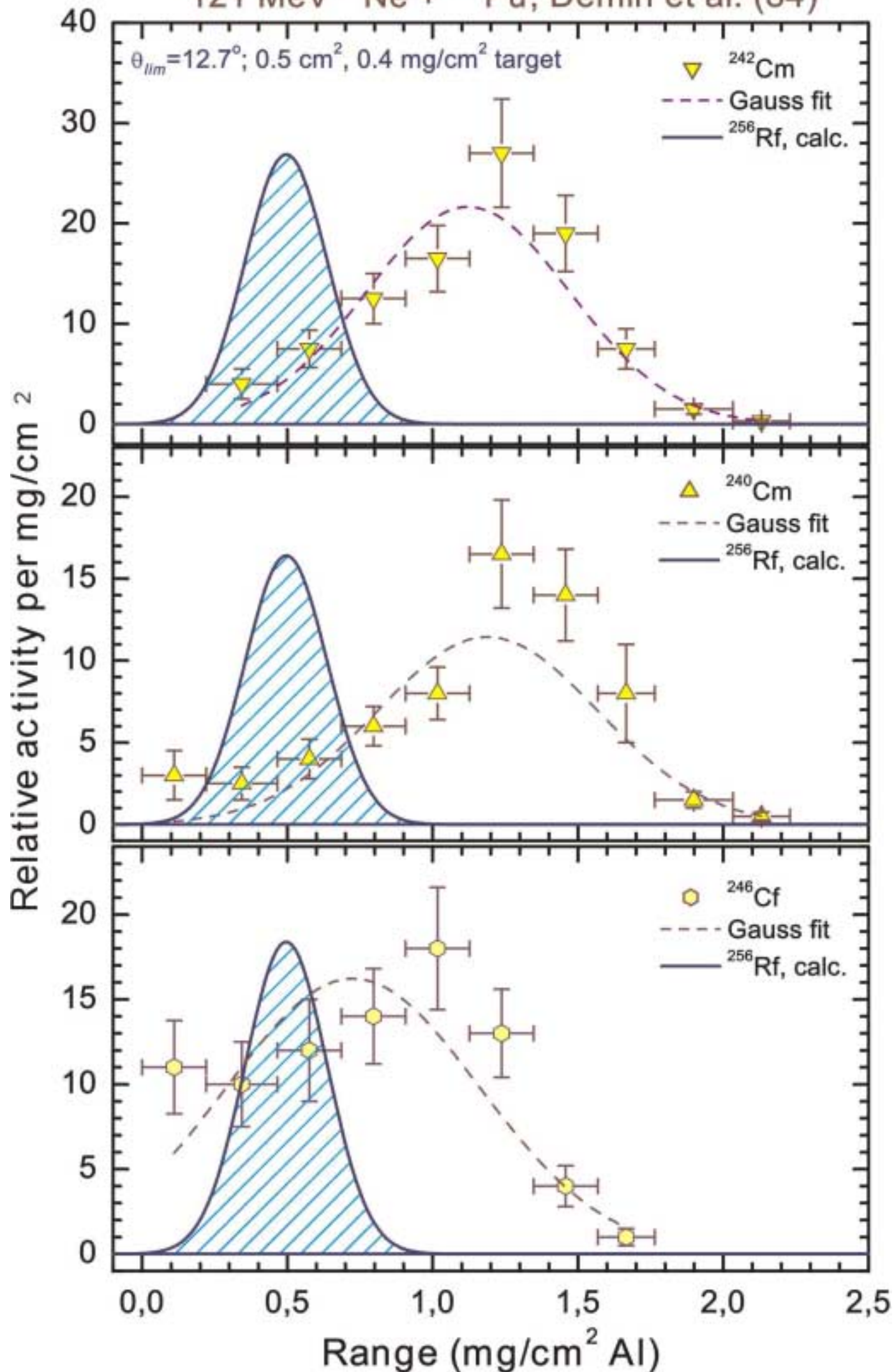




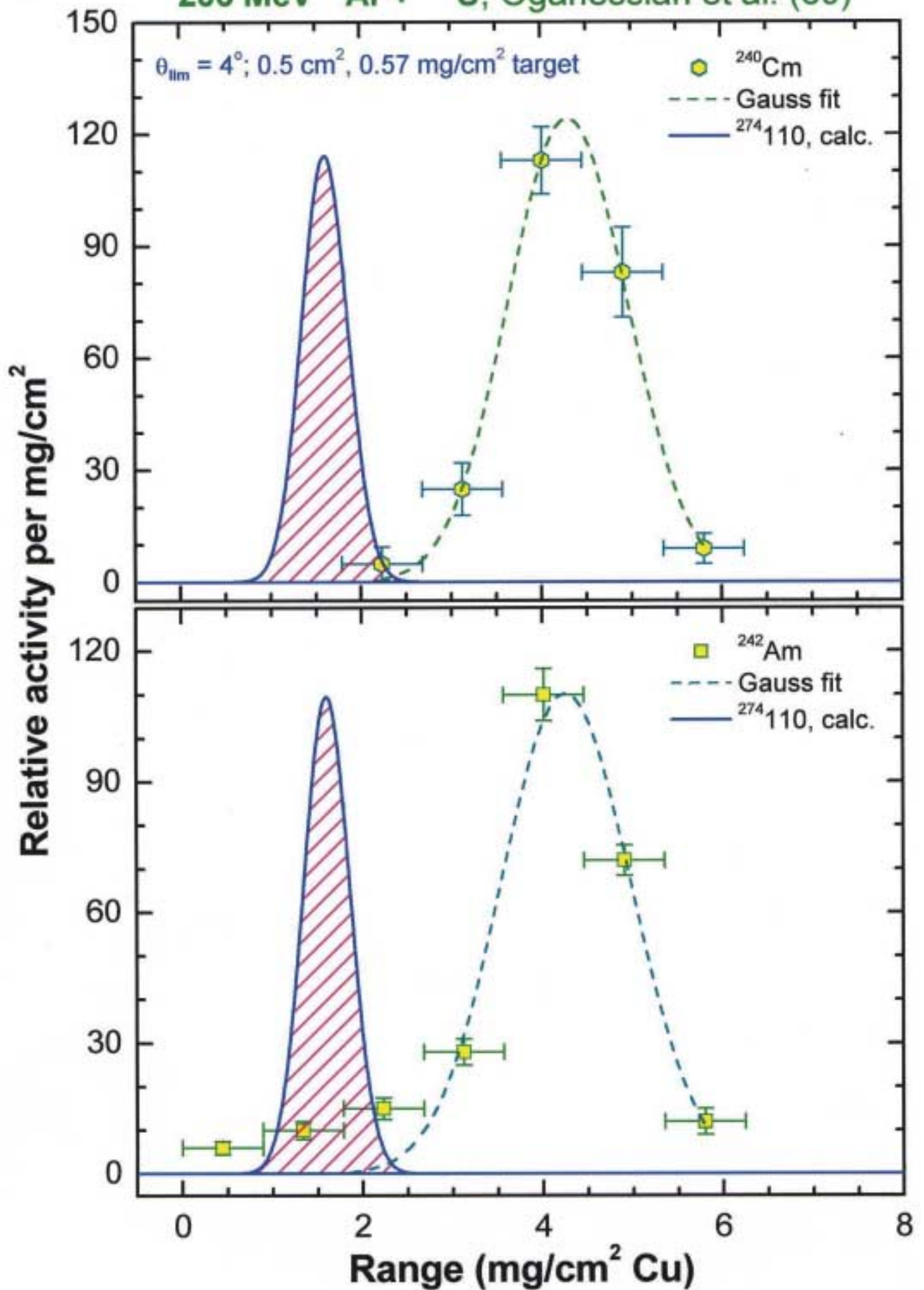
118 MeV $^{22}\text{Ne} + ^{249}\text{Bk}$, Demin et al. (84)



121 MeV $^{22}\text{Ne} + ^{239}\text{Pu}$, Demin et al. (84)



206 MeV $^{40}\text{Ar} + ^{238}\text{U}$, Oganessian et al. (89)

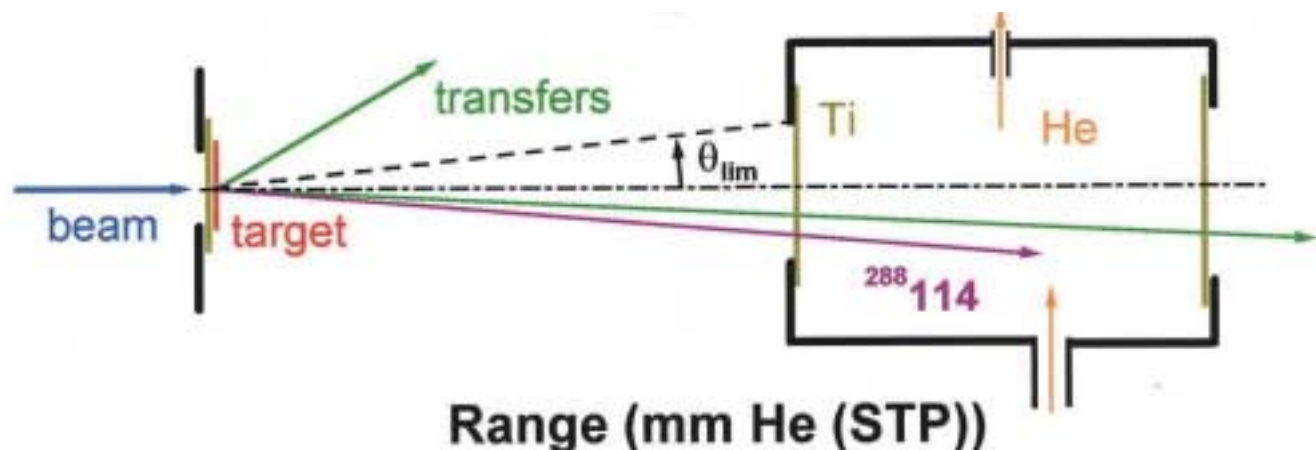


**Suppression factors for target-like transfer products (TLTP)
obtained in experiments on angular and range distribution
measurements and collection efficiency for ER according to the
calculations (part 1)**

Reaction	E_{lab} (MeV)	W_{target} (mg/cm²)	S_{target} (cm²)	TLTP	Possible transfer	Θ_{lim} (deg)
²² Ne+ ²³⁹ Pu	121	0.4	0.5	²⁴⁰ Cm	+2p-1n	12.7
				²⁴² Cm	+2p+1n	
				²⁴⁶ Cf	+4p+3n	
²² Ne+ ²⁴⁹ Bk	118	0.15	2.0	²⁵² Fm	+3p	
				²⁵⁶ Md	+4p+3n	
		0.3	0.1			6
⁴⁰ Ar+ ²³⁶ U	206	0.57	0.5	²⁴² Cm	+4p+2n	3
						6
				²⁴⁰ Cm	+4p	3
						4
						6
⁴⁰ Ar+ ²³⁸ U				²⁴² Am	+3p+1n	4
						6
				²⁴⁰ Cm	+4p-2n	4
⁴⁸ Ca+ ²⁴⁴ Pu	236	0.8	0.5	²⁵⁶ Fm	+6p+6n	6.8
		1.2				8.5

**Suppression factors for target-like transfer products (TLTP)
obtained in experiments on angular and range distribution
measurements and collection efficiency for ER according to the
calculations (part 2)**

Reaction	Suppression factor for TLTP selected in			Collection efficiency for ER (%) selected in			ER
	Angle	Range	Total	Angle	Range	Total	
$^{22}\text{Ne}+^{239}\text{Pu}$		16.3		94.3	68	64.1	^{256}Rf
		11.8					
		7.8					
$^{22}\text{Ne}+^{249}\text{Bk}$		2500		99.9	68	68	^{267}Bh
		7.7					
	28.4	9.9	281	84.3	68	57.3	
$^{40}\text{Ar}+^{236}\text{U}$	250						$^{272}110$
	21.3						
	286						
	192						
	27						
$^{40}\text{Ar}+^{238}\text{U}$	222	25	5550	74.6	68	50.7	$^{274}110$
	30.3			88.7			
	128						
$^{48}\text{Ca}+^{244}\text{Pu}$	(20)	(25)	(500)	92.7	68	63	$^{288}114$
				90.0			



Range (mm He (STP))

12 16 20 24 28 32 36

$236 \text{ MeV } ^{48}\text{Ca} + ^{244}\text{Pu} \rightarrow ^{288}_{114}$

$W_{Ti} = 0.74 \text{ mg/cm}^2$

Count / 0.4 MeV

- \square — $W_t = 0.4 \text{ mg/cm}^2$
- \circ — $W_t = 0.8 \text{ mg/cm}^2$
- \triangle — $W_t = 1.2 \text{ mg/cm}^2$
- \diamond — $W_t = 1.6 \text{ mg/cm}^2$

$W_{Ti} = 1.0 \text{ mg/cm}^2$

