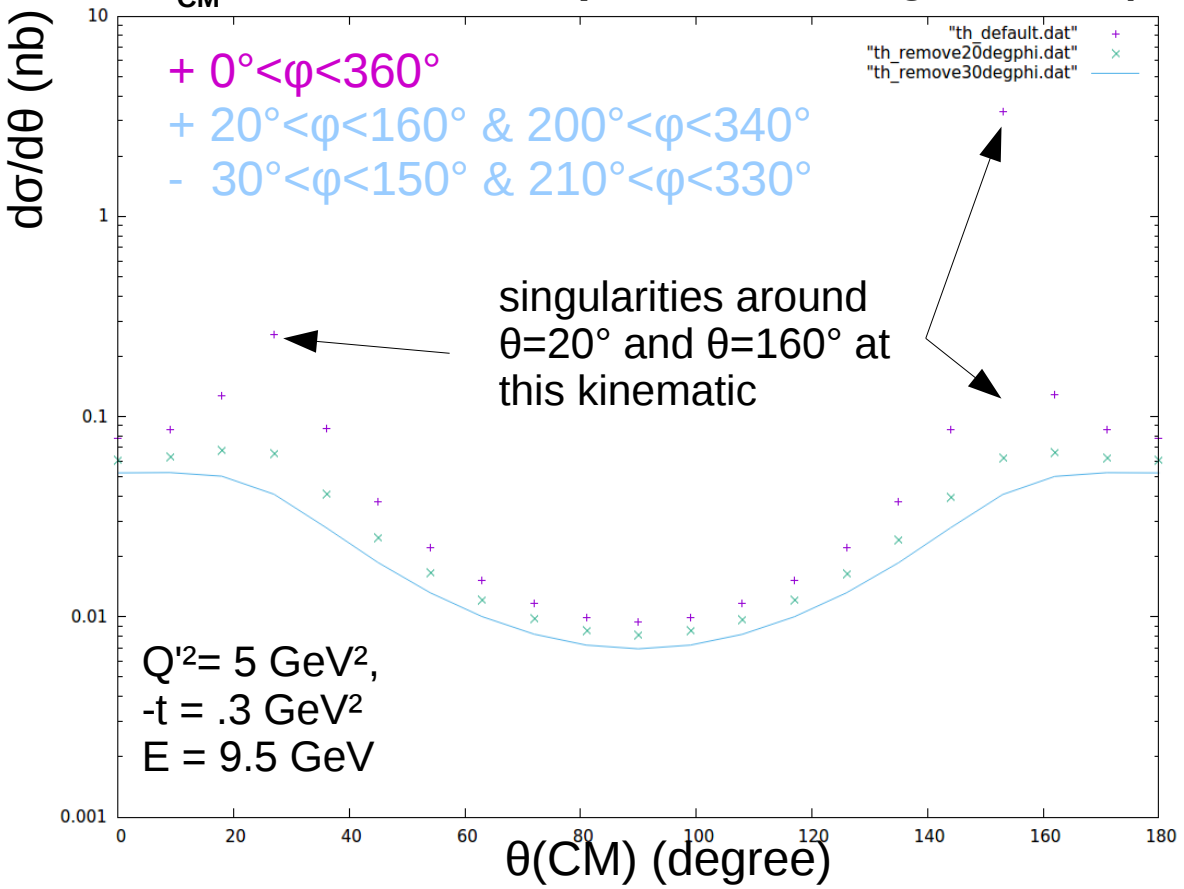
θ_{CM} with different options for integral over φ



• "physics" distribution in θ symmetric when integrated on symmetric range in φ like here

• accuracy in integrals here is limited on purpose to reflect experimental issues when σ increase very fast (limited statistic, bin size, resolution...)
⇒ if a difference exists between the 2 pics ≡ region to avoid

cross sections at θ=27°/153°
no φ cut: σ(BH)=0.24 / 3.0 nb
φ cut of (0,π) ±20°: σ=0.065 / 0.062 nb
φ cut of (0,π) ±30°: σ=0.042 / 0.042 nb

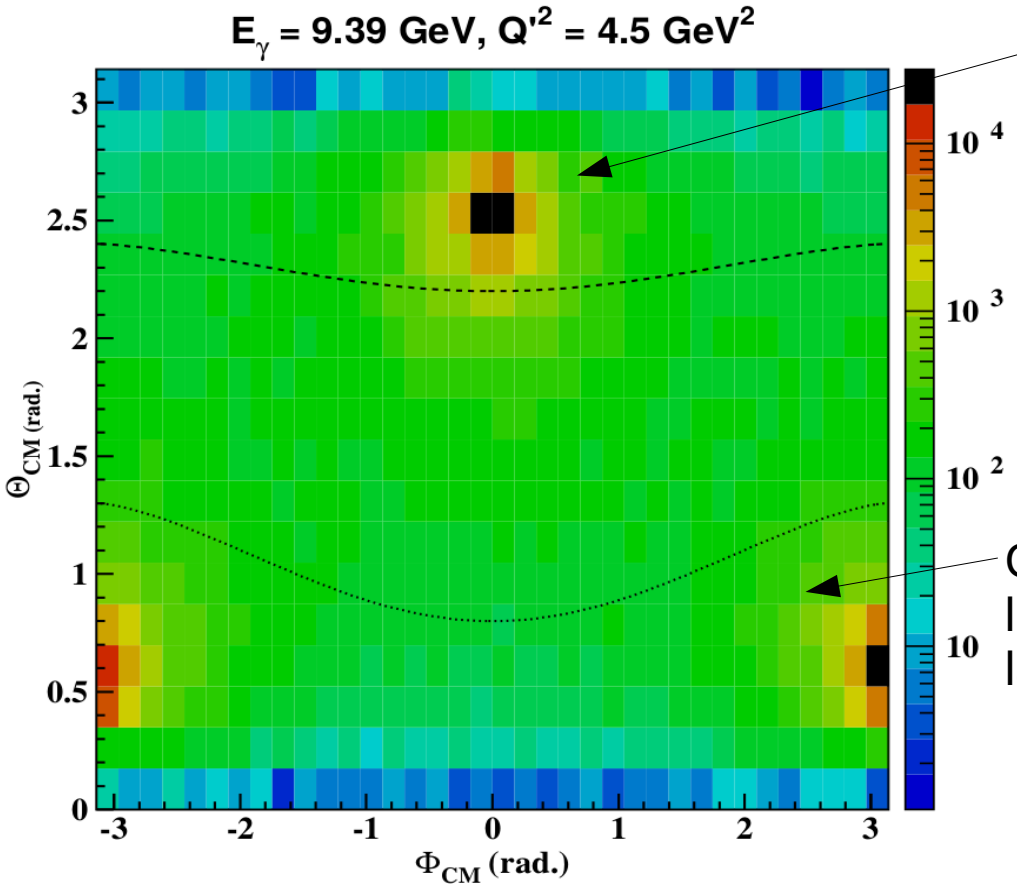
• To avoid singularities, angular cuts with kinematic dependence (Q'², t, E):
$\theta_{min} < \theta < \theta_{max}$ & (30°<φ<150° & 210°<φ<330°) above/below $\theta_{min, max}$,then extentable to [10°, 170°] (I checked)
⇒ has to be taken account for "experimental observable" of integrated cross section
⇒ Impact on statistics and gain within acceptance need to be studied for extended cut (cost in systematics)

• Table:

(units GeV)	E	-t	Q'²	θ_{min}	($\theta_{max} = \pi - \theta_{min}$)
example line:	9.5	0.27	4.9	35	

done: table & mapping of angular limits over the full phase space with various φ cuts
to do: table with E dependence, **relation θCM vs θlab and acceptance**,
map of TCS rates + various corrections to match "experimental" cross section

Example with CLAS12 (from E12-12-001 experiment)



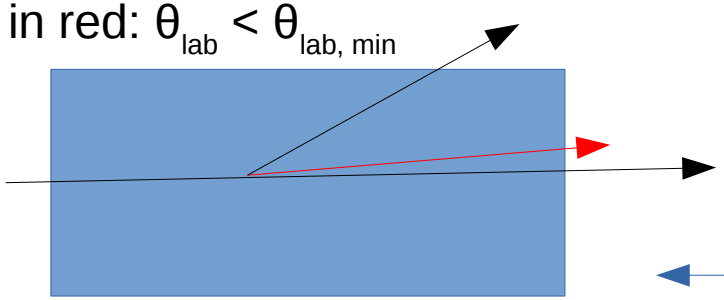
singularity region out of acceptance for CLAS12

CLAS12 acceptance shape from correlation θlab and θCM

GlueX: better forward acceptance, lines will move closer to pics large -t as well

Are additional cuts necessary to avoid singularities?
To do: generate this figure for GlueX with $\theta_{lab} > \theta_{lab,\,min}$

in red: $\theta_{lab} < \theta_{lab,\,min}$



boost

CM (e+e-)