We hope you the workshop was useful and enjoyable for you

Thank you for your instructive slides, which we can study more carefully later...
...and maybe some collaborations could be born?

1. we want to calculate: $\langle A(P_f,S_f),e(q,s)|i\int d^4y(\sum_J C_J O_J+h.c.)|\mu A(P_i,S_i)\rangle$
(and possibly to excited final states?)
for $O_J\in$

$$[\overline{e}\sigma_{\alpha\beta}F^{\alpha\beta}P_X\mu],[\overline{e}P_X\mu]GG,[\overline{q}\Gamma_N q][\overline{e}\Gamma_l\mu]\ \text{ for }\ \Gamma_N\in\{P_X,\gamma^\alpha P_X,\gamma_5,\sigma^{\alpha\beta}P_X\}$$

for chiral fermions so $X\in\{L,R\}$(see Frederic Noel's slides).
Up to 2nucleon ops (for which see 2203.09547 of V. Cirigliano), equivalent to calculating with

$$O_J\in\qquad[\overline{N}\Gamma_N N][\overline{e}\Gamma_l\mu]\ \text{ for }\ \Gamma_N\in\{I,\gamma^\alpha,\gamma_5,\gamma^\alpha\gamma_5,\sigma^{\alpha\beta}\}+\ \text{dipole}$$

which gives an S-matrix element (up to normalisation conventions, factors i, 2-nucleon currents...)

$$\propto\int d^4y\int\frac{d^3k}{(2\pi)^3}\overline{u_e}(\vec{q})\Gamma_l\widetilde{\psi}_\mu(\vec{k})e^{-i(k-q)y}\langle Al(\vec{P}_f)|[\overline{\hat{N}}\Gamma_N\hat{N}(y)]|Al(\vec{P}_i-\vec{k})\rangle$$

and need to include Coulomb-distorted e-wavefn (see Yuichi Uesaka's talk). This can become the KKO formulae using form-factors (see Cirigliano 2203.09547,app A), or in QFT (I will fix my slides...)

...many effects to think about/calculate/include ...

...deformed nuclei, heavy targets, muon effects on the nucleus...

...pions in the nucleus...

2. reliable calculations would be nice —thanks in advance for all upcoming calculations :) — uncertainties are even better!

suppose $see\ \mu A \to eA$
$\Rightarrow$ want to identify the contributing operator coefficients—how?
KKO showed that overlap integrals are A, Z-dependent, so measure slightly different combination of coefficients with different targets.

$\Rightarrow$ to address "which targets given independent constraints", uncertainty is crucial. Eg, if :

$$BR(eTi \to \mu Ti) \propto |S^{(n)}_{Ti} C^{(n)}_S + S^{(p)}_{Ti} C^{(p)}_S|^2 \ , \ \ BR(eAu \to \mu Au) \propto |S^{(n)}_{Au} C^{(n)}_S + S^{(p)}_{Au} C^{(p)}_S|^2$$

need uncertainty on overlap integrals $S^{(N)}_A$ smaller than TI-Au differences, in order to determine $C^{(n)}_S$ and $C^{(p)}_S$. (see Y Kuno slides: studied for KKO overlap intergrals, assuming $\sim$ 10% uncertainty from NLOχPT)

What are the response functions with uncertainties?
$\Rightarrow$ which targets give independent constraints on operator coefficients (on nucleons)

When see $\mu A \to eA$, what are interesting sequences of targets for experiment in order to identify coefficients?

(exptal and theory input required to define "nice" targets)

...eg: are isotopes of a nucleus interesting for subdominant operators?

Thank you for participating!

Comments? Suggestions?

And have a good trip home :)