## PDG I

Antilepton + meson

$ au_1$	$N{ ightarrow} e^+\pi$	В	> 5300 (n), $> 24000$ (p)	CL=90%	459	~
$ au_2$	$N\! ightarrow\mu^+\pi$	В	> 3500 (n), $> 16000$ (p)	CL=90%	453	~
$ au_3$	$N\! ightarrow  u\pi$		> 1100 (n), $>$ 390 (p)	CL=90%	459	~
$ au_4$	$p  ightarrow e^+ \eta$		> 10000	CL=90%	309	~
$ au_5$	$p  ightarrow \mu^+ \eta$		> 4700	CL=90%	297	~
$\tau_6$	$n  ightarrow  u \eta$		> 158	CL=90%	310	~
$\tau_7$	$N\! ightarrow e^+ ho$		> 217 (n), > 720 (p)	CL=90%	149	~
$ au_8$	$N\! ightarrow\mu^+ ho$		>228 (n), $>570$ (p)	CL=90%	113	~
$ au_9$	$N\! ightarrow  u ho$		> 19 (n), > 162 (p)	CL=90%	149	~
$ au_{10}$	$p  ightarrow e^+ \omega$		> 1600	CL=90%	143	~
$ au_{11}$	$p  ightarrow \mu^+ \omega$		> 2800	CL=90%	105	~
$ au_{12}$	$n  ightarrow  u \omega$		> 108	CL=90%	144	~
$ au_{13}$	$N \!  ightarrow e^+ K$	В	> 17 (n), > 1000 (p)	CL=90%	339	~
$\tau_{14}$	$p  ightarrow e^+ K_S^0$				337	~
$ au_{15}$	$p  ightarrow e^+ K_L^0$				337	~
$ au_{16}$	$N\! ightarrow\mu^+K$	В	> 26 (n), > 4500 (p)	CL=90%	329	~
$\tau_{17}$	$p  ightarrow \mu^+ K^0_S$				326	~
$\tau_{18}$	$p  ightarrow \mu^+ K_L^0$				326	~
$ au_{19}$	$N\! ightarrow  u K$		> 86 (n), > 5900 (p)	CL=90%	339	~
$\tau_{20}$	$n  ightarrow  u K_S^0$		> 260	CL=90%	338	~
$ au_{21}$	$p ightarrow e^+K^*(892)^0$		> 84	CL=90%	45	~
$ au_{22}$	$N  ightarrow  u K^*(892)$		> 78 (n), > 51 (p)	CL=90%	45	~

$ au_{42}$	$p  ightarrow e^+ \gamma$	> 670	CL=90%	469	~
$ au_{43}$	$p  ightarrow \mu^+ \gamma$	> 478	CL=90%	463	~
$ au_{44}$	$n  ightarrow  u \gamma$	> 550	CL=90%	470	~
$ au_{45}$	$p  ightarrow e^+ \gamma \gamma$	> 100	CL=90%	469	~
$\tau_{46}$	$n  ightarrow  u \gamma \gamma$	> 219	CL=90%	470	~

$ au_{62}$	$N \!  ightarrow e^+$ anything	> 0.6 (n, p)	CL=90%	~
$ au_{63}$	$N\! ightarrow\mu^+$ anything	> 12 (n, p)	CL=90%	~
$\tau_{64}$	$N\! ightarrow  u$ anything			~
$\tau_{65}$	$N\! ightarrow e^+\pi^0$ anything	> 0.6 (n, p)	CL=90%	~
$\tau_{66}$	N ightarrow 2 bodies, $ u$ -free			~

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## On which modes should resources be focused?

- Flagship searches:  $ho 
  ightarrow e^+ \pi^0, \, 
  ho 
  ightarrow K^+ ar{
  u}$
- Other ideas:
  - Limit for  $ho 
    ightarrow e^+ \eta$  pretty good, complementary in SMEFT analysis
    - $\hookrightarrow$  motivates complete lattice calculations?
  - Limits for p → Vℓ<sup>+</sup>, V = ω, ρ, φ, K<sup>\*</sup>, currently an order of magnitude worse, is this only due to lack of attention?
  - If not, calculation of matrix elements possible? Resonance enhancement? Complementarity for SMEFT?
  - Photon channels  $p 
    ightarrow e^+ \gamma$  motivated? [PDG limit outdated]
  - $\ell = \tau$  channels accessible via off-shell process (momentum dependence of  $W_0$ ,  $W_1$  known from dispersion relations),  $p \to \pi^0 \ell^+ \nu_\ell \bar{\nu}_\tau$  covered by inclusive limits  $p \to \ell^+ X$
  - In general: many channels required to probe all possible operators, unrealistic
    - $\hookrightarrow$  a few theory-motivated exclusive searches + inclusive searces
  - How viable are inclusive searches experimentally?
  - High-multiplicity actually advantageous for DUNE?
  - Matrix elements for five-quark operators?