A_N(pC) from H-jet calibration

- D. Smirnov is developing pC pol. offline analysis: selection, kin. region, …
- Results compiled on web page: http://yellowpc.rhic.bnl.gov/rundb/
- So far using *rough* analyzing power A_N(pC) @ 250 GeV from Run9

Cnipol Run Index

Run	Date & Time	Polarimeter	Polarization, %	Type	Beam Energy, GeV	Target	Num. of Events		Analyzed
							Total	Processed	
15223.002	Feb 24, 2011 02:32:55 Thu	B1U							
15223.001	Feb 24, 2011 01:39:53 Thu	B1U	55.2 ± 1.9		23.70	H Target3	61,630,147	61,630,147	
15222.001	Feb 24, 2011 00:31:20 Thu	B1U	57.5 ± 2.1		23.70	H Target3	47,613,157	47,613,157	
15217.308	Feb 23, 2011 07:43:39 Wed	Y2U	48.7 ± 2.7		249.73	V Target1	64,498,633	32,249,317	
15217.307	Feb 23, 2011 07:42:09 Wed	Y2U	35.3 ± 11.5		249.73	V Target1	4,424,177	2,212,089	
15217.008	Feb 23, 2011 07:39:58 Wed	B1U	36.5 ± 2.7		249.73	H Target3	59,840,882	29,920,441	
15217.007	Feb 23, 2011 07:38:42 Wed	B1U	58.8 ± 23.2		249.73	H Target3	1,075,187	537,594	
15217.306	Feb 23, 2011 07:34:42 Wed	Y2U	42.8 ± 2.4		249.73	V Target1	77,113,586	38,556,793	
15217.006	Feb 23, 2011 07:30:33 Wed	B1U	40.7 ± 3.3		249.73	H Target3	42,742,440	21,371,220	
15217.305	Feb 23, 2011 04:55:10 Wed	Y2U	42.3 ± 2.5		249.73	V Target1	71,510,575	35,755,288	
15217.005	Feb 23, 2011 04:51:49 Wed	B1U	40.7 ± 3.0		249.73	H Target3	51,773,274	25,886,637	
15217.304	Feb 23, 2011 02:51:55 Wed	Y2U	39.2 ± 2.7		249.73	V Target1	67,593,683	33,796,842	
15217.004	Feb 23, 2011 02:48:44 Wed	B1U	35.5 ± 2.9		249.73	H Target3	53,014,793	26,507,397	
15217.303	Feb 23, 2011 00:49:09 Wed	Y2U	48.9 ± 2.1		249.73	V Target1	101,366,515	50,683,258	
15217.003	Feb 23, 2011 00:45:33 Wed	B1U	40.3 ± 2.5		249.73	H Target3	72,336,468	36,168,234	
15217.302	Feb 23, 2011 00:14:15 Wed	Y2U	49.0 ± 1.9		249.73	V Target1	126,032,911	63,016,456	
	Feb 23, 2011 00:10:12								

- Now with > 10 days good jet runs can recalibrate A_N(pC) for this analysis...

A_N(pC) from H-jet calibration

- Data from 9 RHIC physics stores
- Each store one value for P(H-jet) each ring Blue/Yellow

  (A. Dion's results https://wiki.bnl.gov/rhicspin/Polarimetry/H-jet)
- In these stores 61 pC measurements @ 250 GeV
- This period all pC data from downstream polarimeters:

  - Blue1: horizontal target (vertical sweep)

  - Yellow2: vertical target (horizontal sweep)
- pC values in range P=30-50%, mean ~40%
- Take ratio: P(H-jet)/P(pC) $\Rightarrow$ correction to P(pC) on web page

  (of course same ring data H-jet & pC, Blue/Yellow)

A_N(pC) from H-jet calibration

- Combine all Blue/Yellow data:

  (only stat. uncert. from pC

  & H-jet measurements)

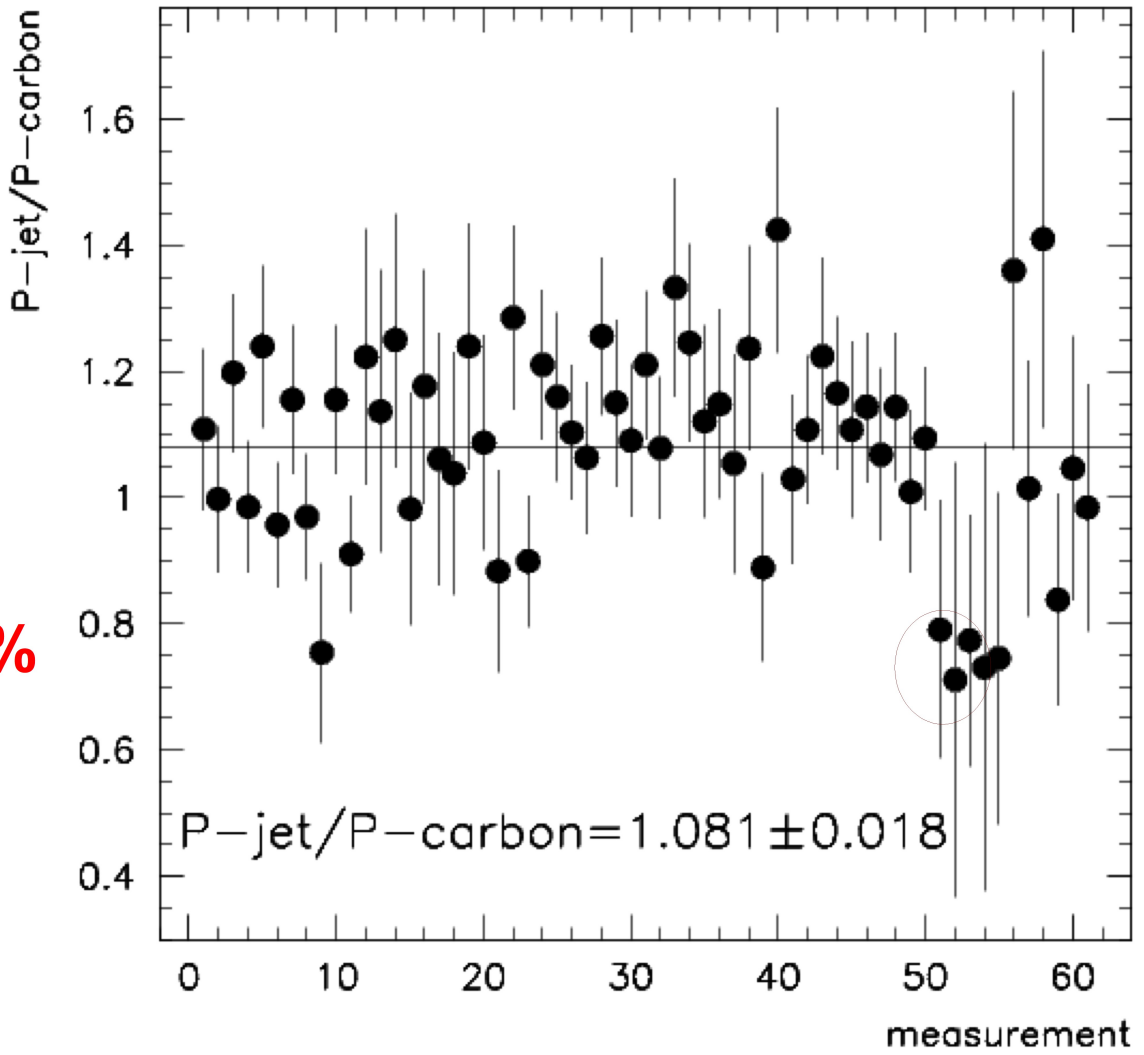
- Correction to web page data:

  +8%

- **At this point stat. uncert. 2%**

- Note: 8% only applies to

  data on web page!



A_N(pC) from H-jet calibration

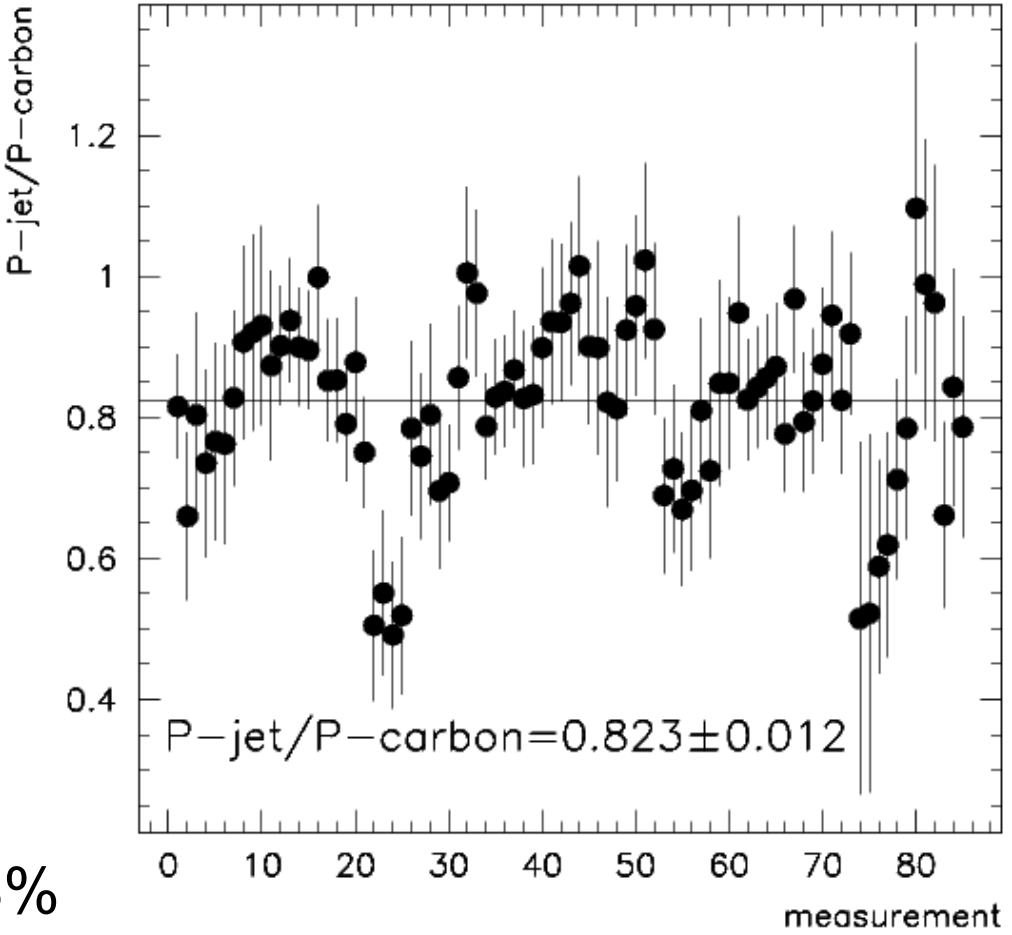
- Also have online pol. results:

  in e-logs, online database, ...
- Somewhat different analysis;

  for some reasons also uses

  A_N(pC) @ 100 GeV
- Can calibrate scale w/ H-jet

  same way with ratios:



- Correction to online pol. data: -18%
- **At this point stat. uncert. ~1%**

A_N(pC) from H-jet calibration

- Just a first check with H-jet of polarization scale

Caveats:

- No polarization variation throughout fills considered yet

- Previous years, and evidence also this year:
  polarization has transverse profile P(x) (x tran. beam coord.)
- With H-jet, pC sweeps measure intensity weighted pol:
  $P_{beam} = \int I(x) P(x) dx$; I(x) = norm. beam intensity profile
  handy measure of "beam polarization"
- For, e.g. single -spin asymmetries need different weighting:
  $P_{s\text{-}s} = \int I^2(x) P(x) dx$ (just sketching idea here)
- Need to measure P(x), correct P_{beam} to $P_{s\text{-}s}$
  work beginning...