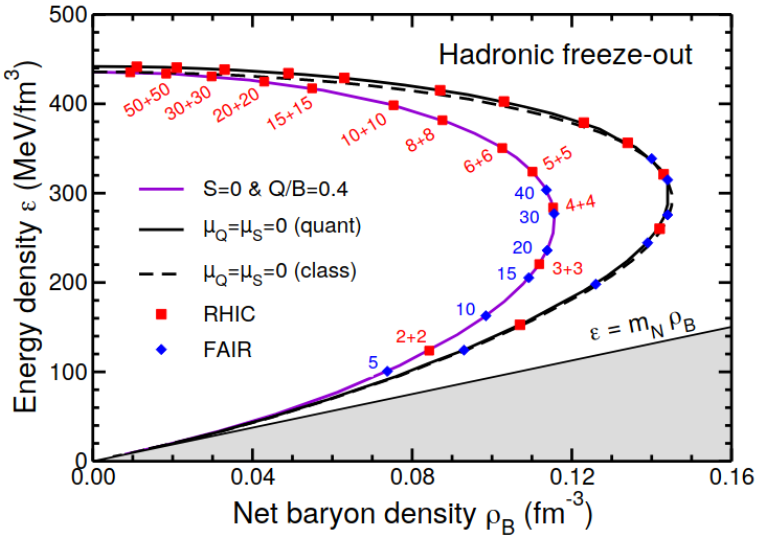
Reachable baryon densities in HIC

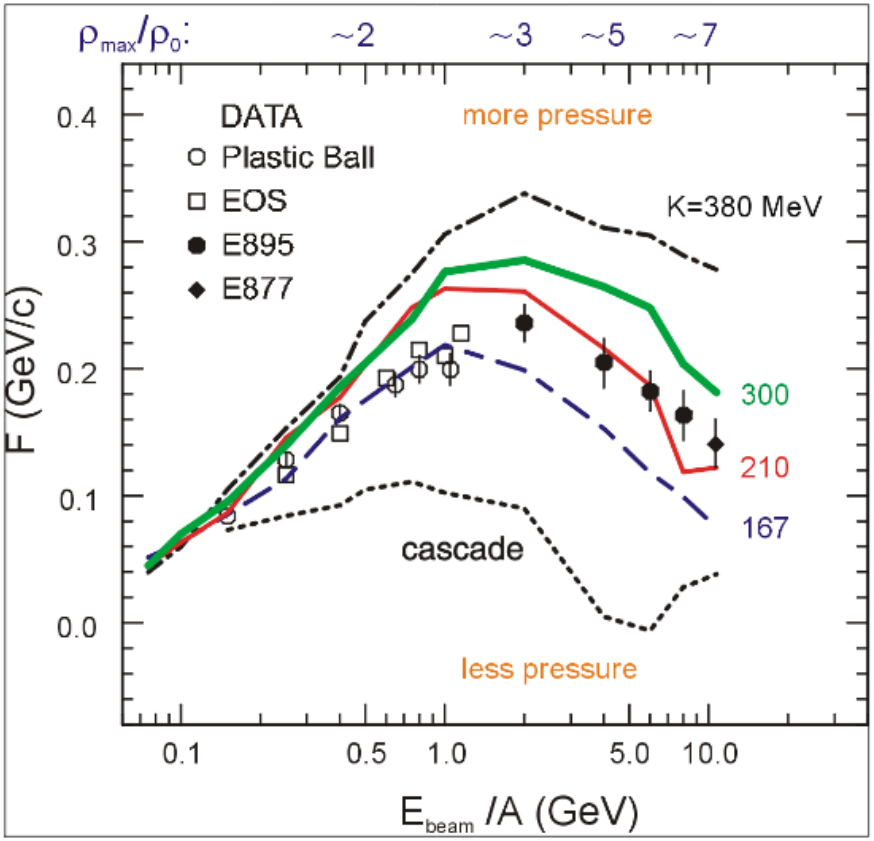


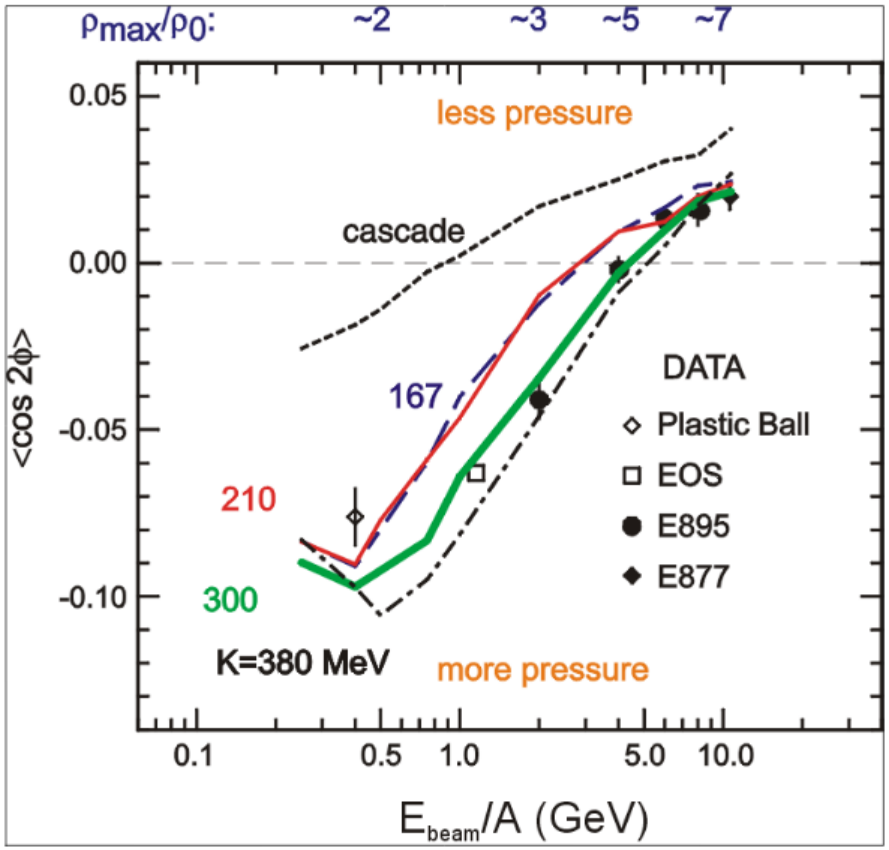
[Cleymans, Randrup, hep-ph/0607065]

- At freeze-out HIC reach at most $0.8n_0$
- At $\sqrt{s_{NN}} = 3 - 5$ GeV densities up to $\simeq 5n_0$ are reached slow enough for local equilibration
- Cumulants don't seem to probe these high densities
- STAR and HADES cumulant measurements likely relate to nuclear liquid-gas transition
- The flow, v_1 and v_2, is sensitive to earlier stages, so maybe to higher density EoS

Flow: repeat old study with new measurement precision?

[Danielewicz, Lacey, Lynch, nucl-th/0208016]

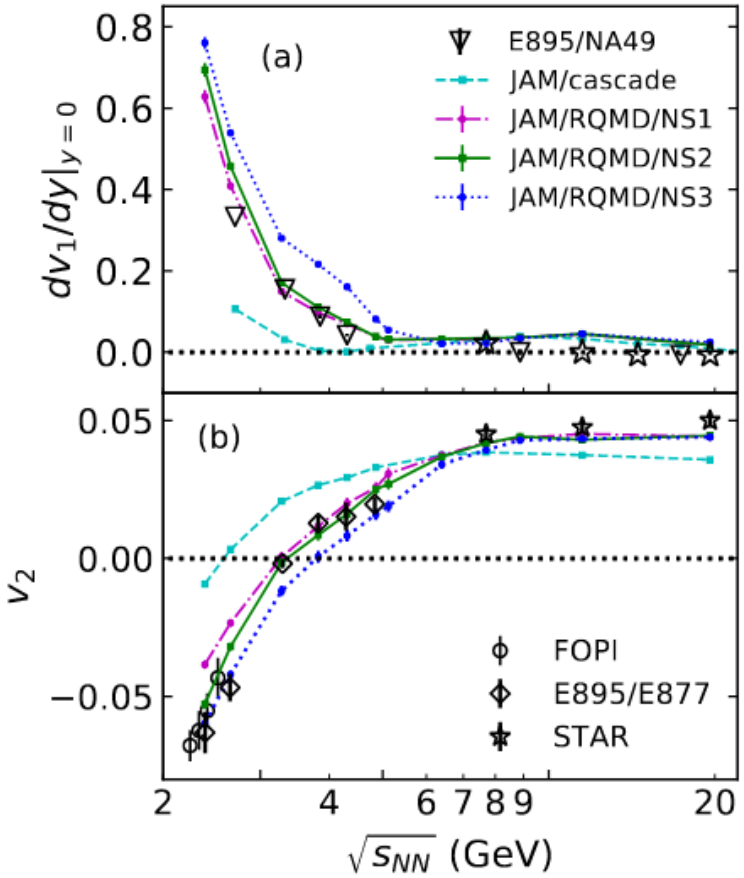




The problem is not the precision of data, it's hard to describe v_1 and v_2 with a single parameter set.

dv_1/dy minimum: what do we learn from it?

[Nara, Stoecker, 1906.03537]



- Both v_1 and v_2 described at $\sqrt{s} < 10$ GeV by conventional nuclear mean fields
- $dv_1/dy(\sqrt{s})$ minimum unexplained
- Other models produce $dv_1/dy(\sqrt{s})$ minimum but at wrong energy

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- More precise knowledge of EoS at large μ_B?
- Critical point, phase transition at few n_0 – is flow sensitive to it?
- Apparently, these questions were not answered 30 years ago. What makes them so challenging? Or I'm wrong and they were answered. Then what are the conclusions?
- Why has dv_1/dy turned so challenging to understand? Are there chances to improve it now?
- Do we need to constrain models better, or we need better models? If better models, then what specifically needs improvement?