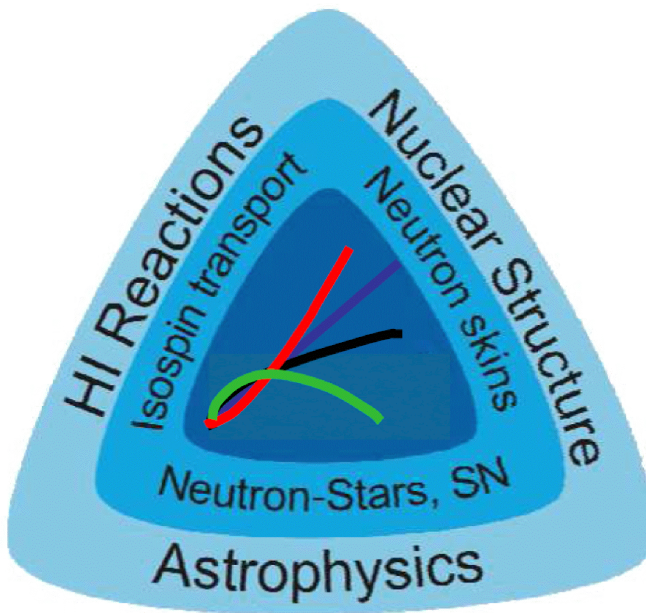


Concluding Remarks

Umesh Garg

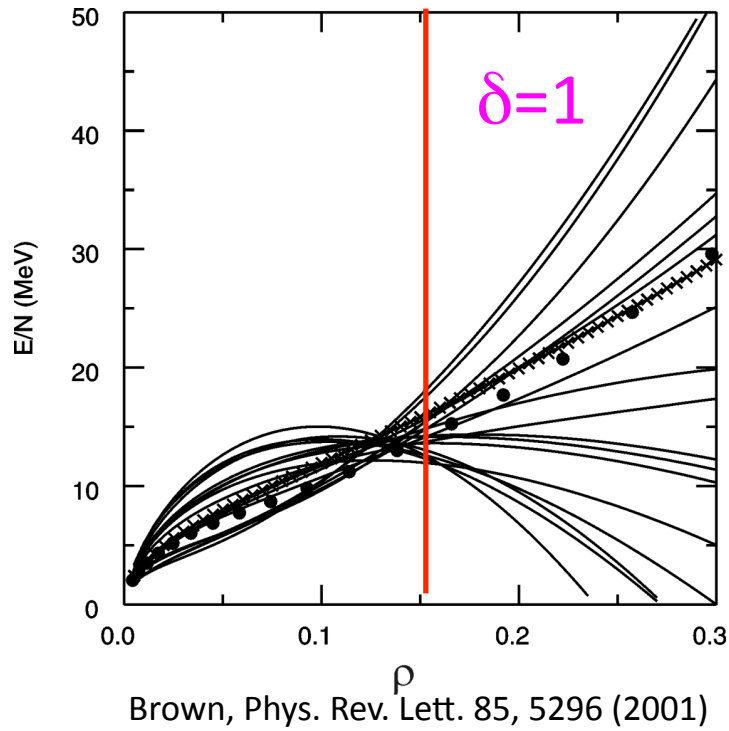
University of Notre Dame





G. Verde

This symbol truly represents the theme of this meeting and we had many interesting presentations on all aspects of this theme except that the Astrophysics part was, perhaps somewhat under-represented, In my opinion.



Nuclear effective interactions do not constrain neutron matter,
Main uncertainty is the density dependence of the symmetry energy

We have certainly come a long way from what this famous figure represented.

We now have sufficient information from different observables that it is no longer appropriate to say that symmetry energy is unconstrained at sub-saturation densities.

But, at the same time, it is not absolutely clear that we know what the final answer might be from each observable.

However, the same cannot be said for the supra-saturation side. We have some information from neutron stars and from HI collisions but perhaps it is too early to deduce any trends.

New data to come from MSU, GSI & RIKEN.

Starquakes? More results on n-star radii?

Q: Can the constraints that we already have for sub-saturation regime be gainfully employed in the supra-saturation regime?

e.g.: Why continue using interactions that give K_∞ very different from the value established by GMR?

- Can we agree on and start using a common “language”? Symbols?

“soft”, “stiff”, “super stiff”, “asy-soft”.....

May be, mention the parameters instead of these terms?

• Convergence of theoretical models?

The figures shown on the next slide are a case in point.

Are we talking about the same things?

How can the same data mean so very different things depending on which model one employs?

How do we sort out what is going into these models?

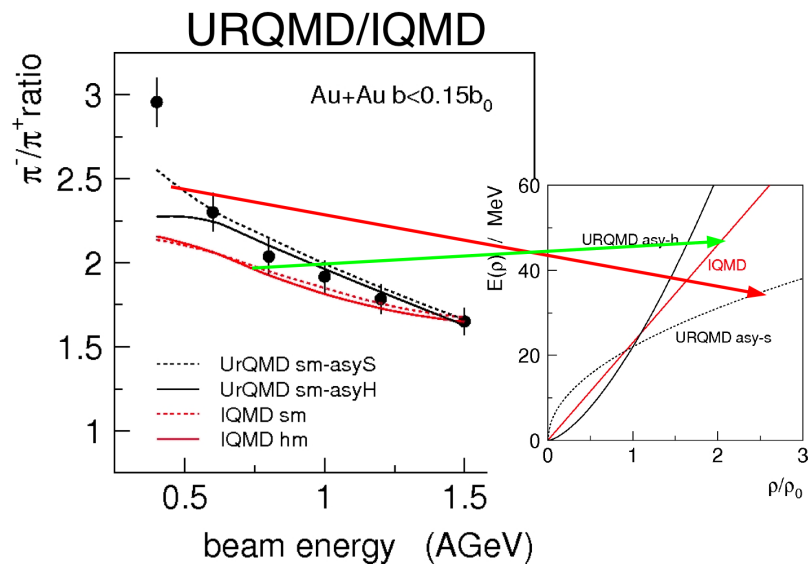
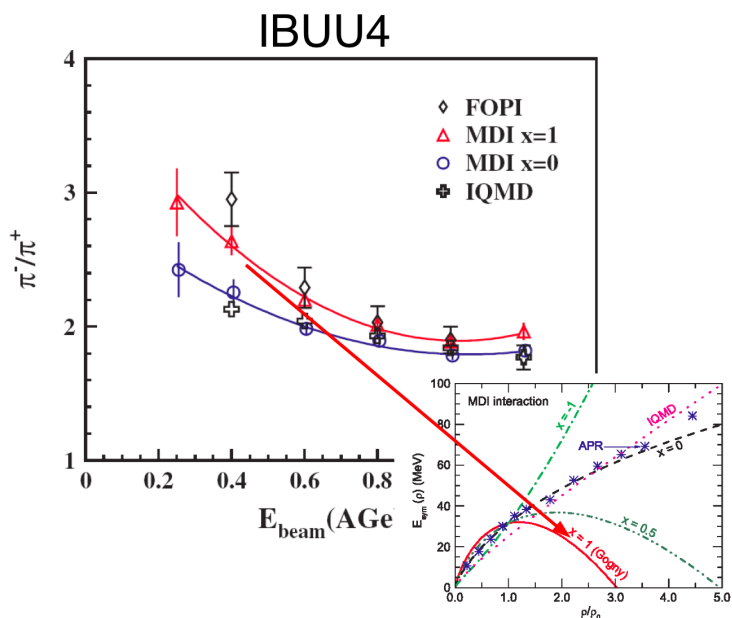
It might be pertinent to note that something similar had occurred in the case of giant resonances, with relativistic vs. non-relativistic models giving very different values for nuclear incompressibility from the same GMR data.

But, finally, the theorists got together and sorted it all out and looks like we have resolved that.

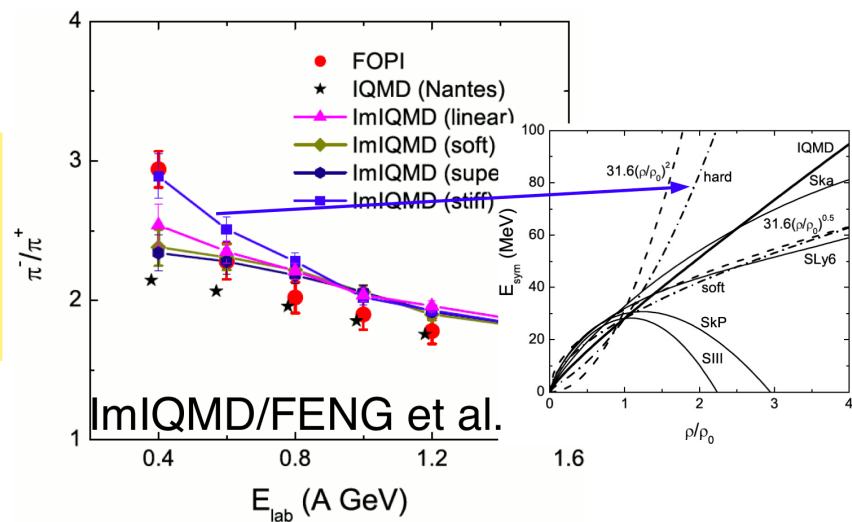
I would like to suggest that the time is ripe for something like that to happen in case of interpreting the HI data as well.

Pion ratio in view of the models

Au+Au central collisions



G.Ferini06	RMF	stiffer
Q. Li 06	UrQmd	softer
Z.Q. Feng 09	ImIQMD	stiffer
Z.G. Xiao, B.A. Li 09	IBUU4	softer



Other issues that appear to have emerged from the discussions:

- “Mapping” between different approaches?
- What measurements might connect the three prongs?
- A place to put together the available info. accessible to interested parties?

Other issues that appear to have emerged from the discussions:

- “Mapping” between different approaches?

How do we connect, for example, the info. obtained from GMR, K_τ , with what we are getting from other measurements (L)?

- What measurements might connect the three prongs?
- A place to put together the available info. accessible to interested parties?

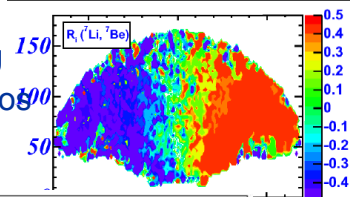
In the end, I come back to the “symbol” of this meeting, with additional material added and shown by G. Verde in his talk.

Except that I have taken the liberty of adding something to the “nuclear structure” node: the giant monopole resonance that has provided direct “experimental” values for the nuclear incompressibility and its asymmetry term.

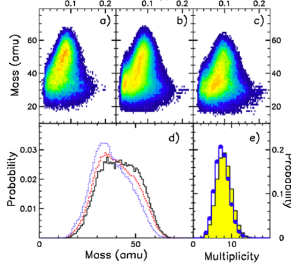
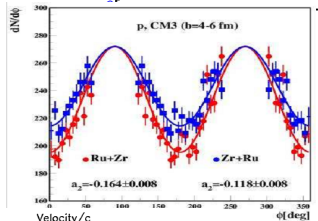


Constraining the Symmetry Energy

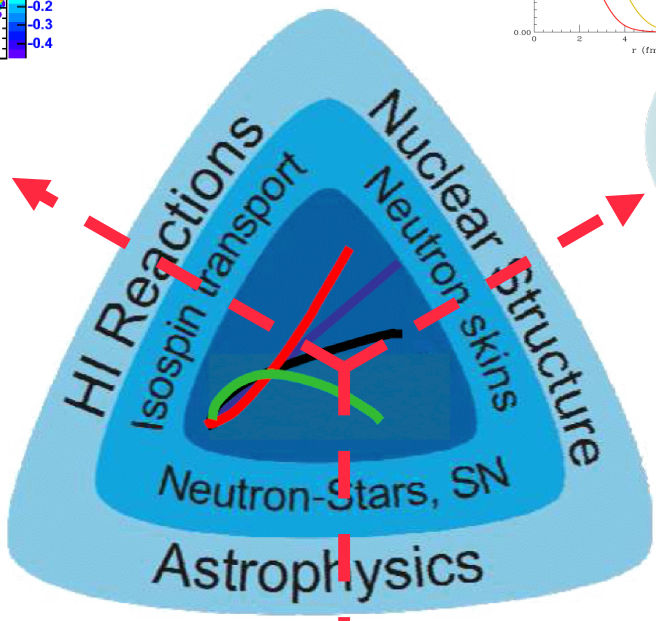
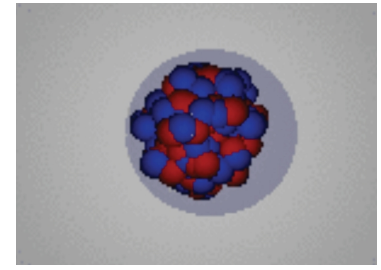
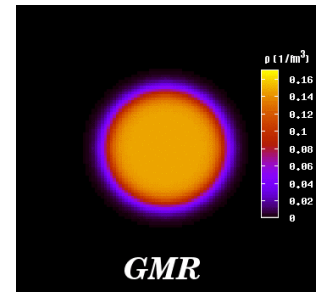
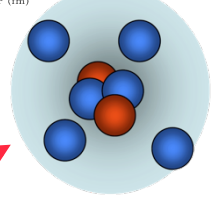
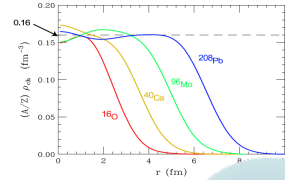
Lassa @ MSU
Imbalance ratios



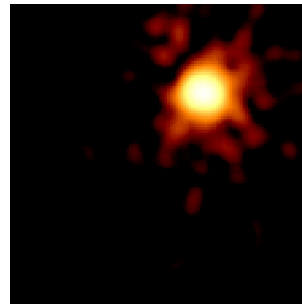
FOPI @ GSI
Elliptic flow



Chimera @ LNS
Competition Inc. Fusion / DIC



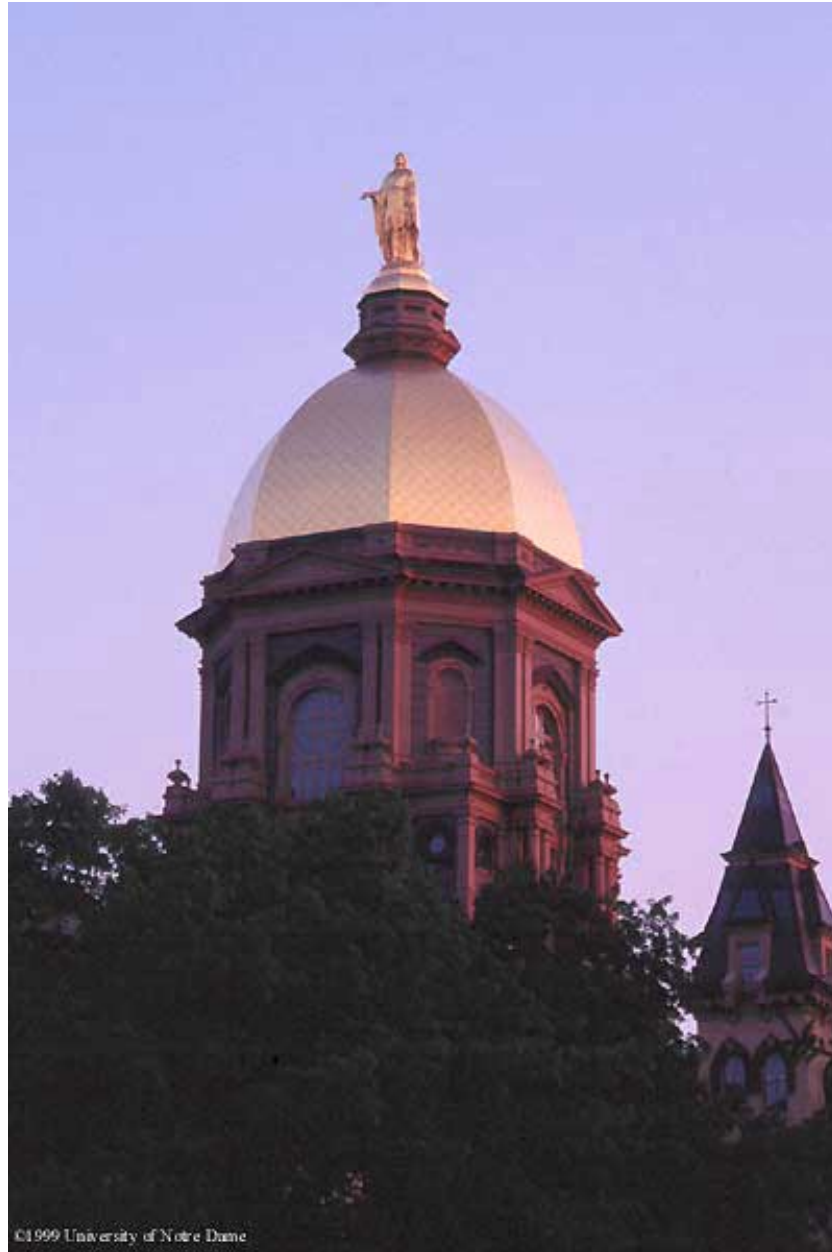
G. Verde



ありがとう

धन्यवाद

Thanks!



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