Concluding remarks to the IWARA 2009

J.E. Horvath

IAG-USP
IWARA in a nutshell...
(2007)
(Very) High Energy

I. Antoniadis: TeV strings & Large extra dimensions
down-to-earth approach

High Energy (experiments)

E. Couto e Silva: FERMI mission already very successful, Searching for a $E>1$ GeV component of GRBs
B self-generated? Collimation?
Isotropic equiv. release of $5M_\odot$

H. Sagawa: TA Collaboration AGN correlation (AUGER) to be confirmed
ANTARES (P. Vernin) and its status: high energy neutrinos

+NESTOR + NEMO = KM3Net

Paella guaranteed!
E. Kemp: AUGER performance and results

GZK drop, no excess

High Energy Astronomy not trivial at all!

protons through a galactic halo field (large scale) with Bz component (Medina Tanco, JEH & de Gouveia Dal Pino, ApJ1998)
Hadrons & QCD

H. Forkel: hadrons as 4D holograms — dualities
“Natural” emergence of trajectories w/universal slope

H. Culetu: hadronic Rindler horizon « mapped »
to Milne spacetime (?unexpected analogy)

H. Pérez Rojas: quantum phenomena vacuum may
be unstable

T. Mendes: QCD in the lattice mapped at least for
finite T. Heavy quark physics CP violation (one of the Zakharov conditions)
Jensen: QCD on the lattice, is it “just” a crossover? (no SQM nuggets, fluctuations etc.?)
NO phase transition, rather a “ionization” of hadrons

F. Navarra: surfing the QGP « glass condensate »
prop. perturbations → hadronization?

F. Steffens: quasi-particles in QCD @ finite T
Gorenstein-Yang solutions (?)

A. Delfino: hadronic point-coupling models
tension between Naturalness and K

M. Bleicher: UrQMD machine, predictions
F. Braghin: breaking self-consistency to peep in models → many solutions

N. Scoccola: non-local (but still separable) interaction coming closer to lattice results
High Tc and crossover ↔ Polyakov loop

D. Gomez Dumm: variety of problems using “post NJL” models → good description of low-energy meson

J. Aichelin: isospin QMD, finite effects blurr EOS making sense of a soft EOS @heavy ion coll. and a hard EOS for NS masses > 1.6
O. Benvenuto: a hurry to form Jupiter before the fuel ends (Saturn+Jupiter?)

Supernovae: mostly neutrino transport, limited flux & "just" 1D not enough

W. Bauer: hydro approach WITH isotopic evolution, explosions?

A. Pérez Martínez: increased stability of bags for a B field $<10^{18}$ G
R. Turolla: the (very) tricky ~1 cm atmosphere

RX J1856.5-3754: featureless
Models and measurements of NS

Low radius imply low masses $< 1 \ M_\odot$

"Observations should not be trusted until confirmed by Theory"

A.S. Eddington

Cas A CCO
(Luna & Pavlov 2009)
Gravitation and Cosmology

I. Radinschi: the dangers of pseudo-things

V. Bezerra: a class of wormhole spacetimes general expression for the self-force for the many «throats» (not easy to swallow!)

E. Guendelman: quantum gravity and baby universes

\textit{creatio ex-nihilo} answered

maybe transplanckian excitations are “God”

A. Bernui: CMBR maps still problematic (skewness, Kurtosis, Psoriasis and other skin disorders)

Non-gaussianity at crossroads (contamination)
Gravitation & Cosmology bis

WHY

Nobody cared about the acceleration of the Universe (or related matters)?

However...

Somebody cared about an even more fundamental thing ... Theory of gravitation

Main points: vacuum solutions without BH

• Fundamental length?
• Which (de Sitter?) symmetry group?
• Much to explore...

“God could not create A Universe that excluded him from certain parts”
G. Marranghelo: NS & Heavy Ions constraints on coupling constants

V. S. Timoteo: renormalizing the renormalizable is NOT easy effective theory

S. Avancini: frustrated (pasta inside crusts)

C. da Providência: focus on the crust (symmetry E)

D. Peres Menezes: proto-NS with Boltzmann transport calculation of spectra (beyond diffusion)
S. Bergliaffa: exploring f(R) gravity through BH solutions \( \rightarrow \) differences @ horizon

I. Bombaci: thermal nucleation of QM (may be bypassed...or not) Quantum stage?

G. Lugones: nucleation issues (with intermediate states)
F. Weber: heating the oven with SQM (Boyd 1988) paradoxical twist of compact star cooling not the ultracool may be SS, rather the hot

S. Duarte: Exo 0748-686 NOT very constrained (even if massive)

R. Xu: bold approach motivated by surface emission properties → Solid quark matter?

Can quark $|\Psi\rangle$ be localized by interactions?

$\alpha_s^2 f(d)/(\hbar_d) \gg 1$ not at all obvious, but worth thinking...
D. Blaschke: quarkonic (Lee-Wick?) phase confinement ↔ gluons

M. Malheiro: polytropic EOS still a business (linear)

S. Schramm: fixing and calculating massive hyperon stars
Troublemaking hyperons ...

Excessive softening could kill model building

A microscopic equation of state for protoneutron stars

Abstract We study the structure of protoneutron stars within the finite-temperature Brueckner-Bethe-Goldstone many-body theory. If nucleons, hyperons, and leptons are present in the stellar core, we find that neutrino trapping stiffens considerably the equation of state, because hyperon onsets are shifted to larger baryon density. However, the value of the critical mass turns out to be smaller than the “canonical” value $1.44 \, M_\odot$. We find that the inclusion of a hadron-quark phase transition increases the critical mass and stabilizes it at about $1.5-1.6 \, M_\odot$. 

G.F. Burgio · M. Baldo · O.E. Nicotra · H.-J. Schulze
Galactic people

G.B. Lima Neto: structure inside large structures

H. Dottori: mysterious alignment of sources M83 (!)

Z. Abraham: hints on the dynamics of inner AGN regions. < 1 mas (soon optical interf.!) «Our» SMBH at Sag A* is starved...

T. Idiart: and the (merging) in E galaxies formation

J.A. de Freitas Pacheco: SMBH evidence and formation (co-evolution puzzle): tracking gas and stars. Downsizing resolved?
GW Physics

G. González: good news (no detection as yet) currently measuring $h \approx 10^{-22}$ OK, Advanced LIGO funded → 10-yr exciting time

By now: no correlated cosmological background
Beated the Crab spindown limit.

Bangalore Sathyaprakash: LISA prospects at low frequencies, testing everything, including Gravitation Theory

V. Ferrari: $r_{\text{tidal}}$ vs. $r_{\text{ISCO}}$ in binary mergers, GRBs? (shortage of energy)

Andromeda's GRB without GW?
Conclusions

• The IWARA has doubled its size, its topics (!) and is doing OK after 4 editions

• Thanks to Marina and Neide for their infinite patience

• Thank the Local Organizers, participants and the hard-working Committees

See you at the IWARA 2011!