CompOSE 2021 discussion session: what we have

N. Chamel, J. Margueron, I. Vidaña

CompOSE

direct link: https://compose.obspm.fr

currently **138 EoS** of various types (Families):

- **cold matter EoS**: predictions for symmetric nuclear matter at T=0
- **cold neutron matter EoS**: predictions for neutron matter at T=0
- **cold neutron star EoS**: predictions for matter in beta equilibrium at T=0
- **general purpose EoS**: predictions for matter at finite T and arbitrary composition (SNA, NSE, etc…)

mostly phenomenological EoS (only 11 microscopic EoS)

mostly hadronic EoS (only 7 hybrid EoS)

From the contributor point of view

What do I gain by uploading my EoS?

Will my paper be more cited?

What credit will I get?

From the user point of view

Are all EoS equally good? Are they consistent with our current knowledge? Do they fit with uncertainty bands from chiral EFT?

How can I know if the EoS fits my needs?

Which paper shall I quote when I use the compOSE repository?

How shall I refer to the EoS in my own paper?

A few suggestions

How to help users not familiar with nuclear/particle physics understand the differences between available EoS?

- provide **additional information** on the models underlying the EoS (main assumptions, domain of validity, etc.)
- include an **additional category** for unified EoS
- provide additional online tools to superimpose on the mass-radius curve further **observational information** (e.g. NICER estimates on radii, LIGO-Virgo constraints, etc. with references to papers where those constraints are discussed)
- idem for **constraints from nuclear physics** (e.g. heavy-ion collisions, giant resonances in nuclei, neutron skins, etc.)

A few suggestions

How to encourage the citation to the original paper where the EoS is calculated?

- Contributors should provide **only 1 reference** associated to their EoS.
- Add the option to **export citations in BibTeX format** (individually or collectively by selecting different EoS) - contributors could be asked to provide it when uploading their EoS
- Use a **conventional naming** for the EoS to avoid any confusion: e.g. the first letters of the first 4 authors, the year, possibly complemented with an index to identify different EoS from the same family

A few suggestions

How to help with the enrichment of the repository and encourage its use?

- **A hand-on session** could be organised at the next **PHAROS schools** to make students more familiar with compOSE (how to use it for their own research, how to upload their own EoS).
- A few standard - but **old** - **EoS are not present** on compOSE, e.g. the SLy EoS from Douchin & Haensel. It would be nice if some people could take care of uploading these EoS. Encourage also the ab-initio community to deposit their EoS.
- Additional **online tools** could be proposed to produce rapidly various plots and test EoS (e.g. mass-radius curve with the possibility to select constraints)