

# LEPTON

MUSES

Veronica Dexheimer

# Past

We discussed the need of a centralized lepton module

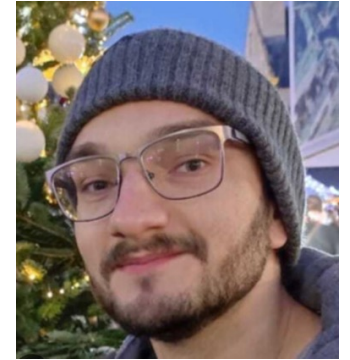
Chose to include all leptons:  $e, \mu, \tau, \nu_e, \nu_\mu, \nu_\tau$  and anti leptons, start at  $T=B=0$ , then  $T \neq 0$ , then  $B \neq 0$

Defined the options of chemical equil. ( $\mu_Q = \mu_{lep}$ ), different leptons ( $e, \mu, \tau, \nu_e, \nu_\mu, \nu_\tau$ ), different lepton  $\mu$ 's, fixed lepton fractions  
...

Wrote all the equations for a free-Fermi gas at  $T \neq B \neq 0$  [link](#)

Completed a YAML draft file with all parameters with values and ranges of applicability [link](#)

# Present and Future



Nikolas Cruz Camacho and Mateus Pelicer are downgrading the new ( $T=0$  and  $B=0$ ) C++ CMF code to become the new lepton module this summer

We will implement (out of/in) chemical equil., near equil. ???, and different lepton fractions

In the fall, Nikolas and Mateus will expand the code to finite temperature

Next year, we will add magnetic field effects

 lepton module

- Project information
- Repository
- Issues 0
- Merge requests 0
- CI/CD
- Security and Compliance
- Deployments
- Packages and registries
- Infrastructure
- Monitor
- Analytics
- Wiki
- Snippets
- Settings

## README.md



## Lepton module

Top-level directory for the Lepton module. Curently this repository contains a relativistic free fermi gas version for  $B = 0, T = 0$ . The code can be executed from source or via Docker.

## Quickstart

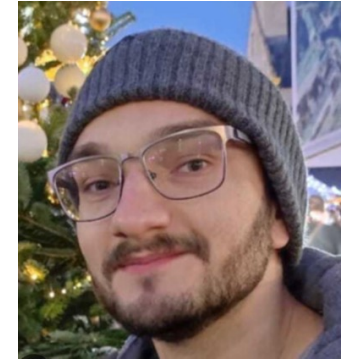
### Required libraries

The module can also be compiled and executed locally without using Docker. For this purpose, the following libraries are required:

- [GSL](#) (For Windows it is easier to use [cygwin](#) and install `libgsl-devel`. For macOS, use [Homebrew](#) `brew install gsl`. For Linux, use your package manager, for instance in Debian use `sudo apt-get install libgsl-dev`)
- [yaml-cpp](#) (For Windows it is easier to use [cygwin](#), install CMAKE, and build yaml-cpp from source with:

```
git clone https://github.com/jbeder/yaml-cpp.git
cd yaml-cpp
mkdir build
cd build
cmake -DYAML_BUILD_SHARED_LIBS=OFF ..
```

# Present and Future



Nikolas Cruz Camacho and Mateus Pelicer are downgrading the new ( $T=0$  and  $B=0$ ) C++ CMF code to become the new lepton module this summer

We will implement (out of/in) chemical equil., near equil. ???, and different lepton fractions

In the fall, Nikolas and Mateus will expand the code to finite temperature

Next year, we will add magnetic field effects

We will also use the lepton module to remove/change lepton content of EoS's

CMF

lepton

