Science and Technology Facilities Council

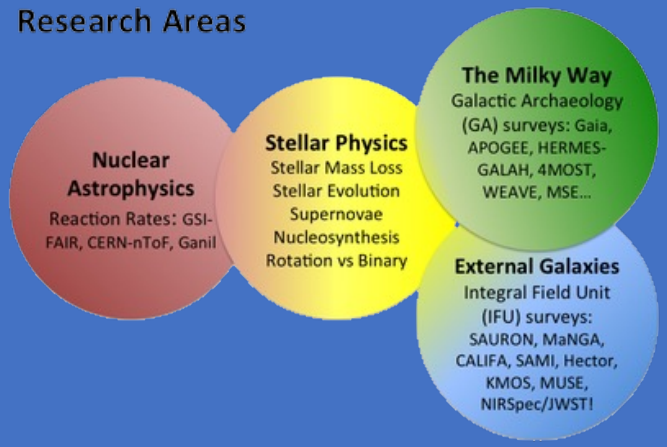
Overview

BRIDGCE is a UK-wide network, supported by the Science and Technology Facilities Council (STFC), part of UK Research and Innovation.

The goal of this network is to facilitate collaborations across the different disciplines involved in the study of the origin of the elements, as well as the use of chemical elements as tracers of the evolution of the Universe.

Currently 75 members (37% female) from 20 institutes across the UK are involved. We have an open membership policy – any UK-based researchers (students, postdocs, and faculty) who work in the relevant research areas can join by signing up on the website: **www.bridgce.ac.uk**

Research Areas



Aims

The main goals of BRIDGCE are the following:

Facilitate transfer of knowledge and collaborations related to the origin of the elements across the various disciplines and institutions in the UK.

Develop synergy between the various expertise available in the UK. A BRIDGCE consortium grant has been awarded from the STFC since 2015.

Liaise with other national and international networks (e.g. JINA and ChETEC) which share the same goals. All BRIDGCE members are eligible for joining IReNA and applying for financial support.

Enhance PhD student training in this multi-disciplinary research area and participation in organizing conferences to acquire management and leadership skills.

BRIDGCE
UK NETWORK

A UK-wide network established to BRIdge research in the different Disciplines related to Galactic Chemical Evolution and nuclear astrophysics.

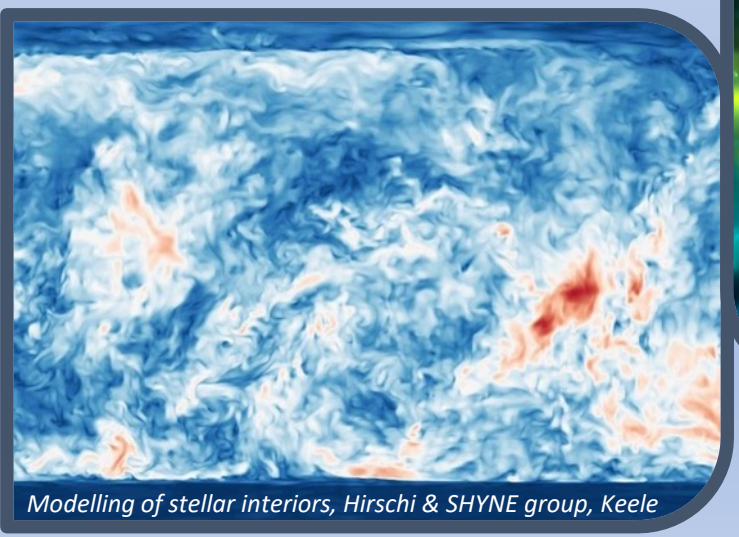
Steering Committee

- Chiaki Kobayashi (Hertfordshire) for galactic chemical evolution (chair)
- Raphael Hirschi (Keele) for stellar astrophysics
- Alison Laird (York) for nuclear physics
- Stuart Sim (Belfast) for supernovae/transients

WHY WAS BRIDGCE UK SET-UP?

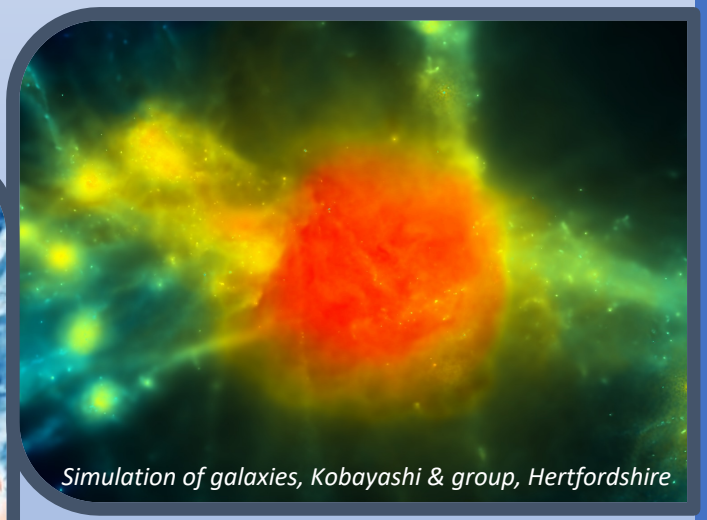
To answer questions like: "Where were the elements we are made of created? How different were the first stars compared to nearby stars? Which nuclear reaction rates affect stellar model predictions? How efficiently are chemical elements mixed in the interstellar medium? What are the building blocks of our galaxy?", knowledge in various disciplines of astrophysics and nuclear physics is necessary.

Nuclear data are a key input for stellar evolution models since nuclear reactions provide the energy that powers stars, and thus determine their lifetimes, and the composition of their final ejecta.



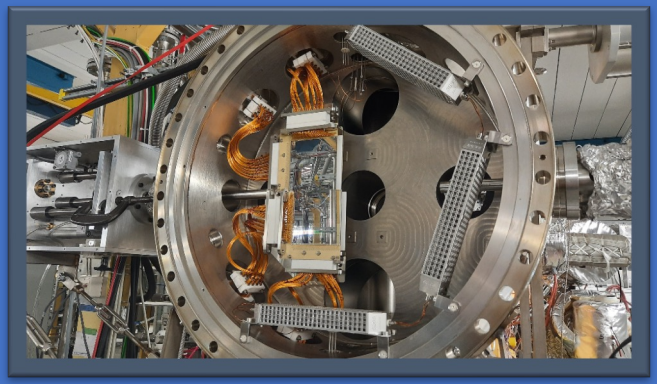
Modelling of stellar interiors, Hirschi & SHYNE group, Keele

Stars, in turn, provide crucial radiative, kinetic, and chemical feedback into the galaxies they belong to through the light they shine, their strong winds and powerful supernova explosions, and the multitudes of chemical elements they produce. Stellar evolution model outputs therefore are key ingredients for galactic chemical models of galaxies. These models follow successive episodes of star formation and trace the history of the enrichment of chemical elements in the Universe.



Simulation of galaxies, Kobayashi & group, Hertfordshire.

The model predictions can then be compared to observations of stars that carry the chemical fingerprints of the cumulative chemical enrichment that preceded their birth. Comparison to observations can thus constrain both the galactic and stellar evolution models and tell us what aspects of the models need to be improved. Stellar evolution models can also be used as virtual nuclear physics laboratories in which we can test the impact of uncertainties in certain nuclear reaction rates.



Edinburgh's CARME set up at GSI

Although there are many experts in the UK trying to answer these questions, research and collaboration across different disciplines of physics is difficult due to separate funding agencies and the lack of efficient knowledge transfer mechanisms between disciplines (in particular between nuclear and astrophysics). The BRIDGCE UK network was set-up to remedy this important problem.