ERC – personal reflections

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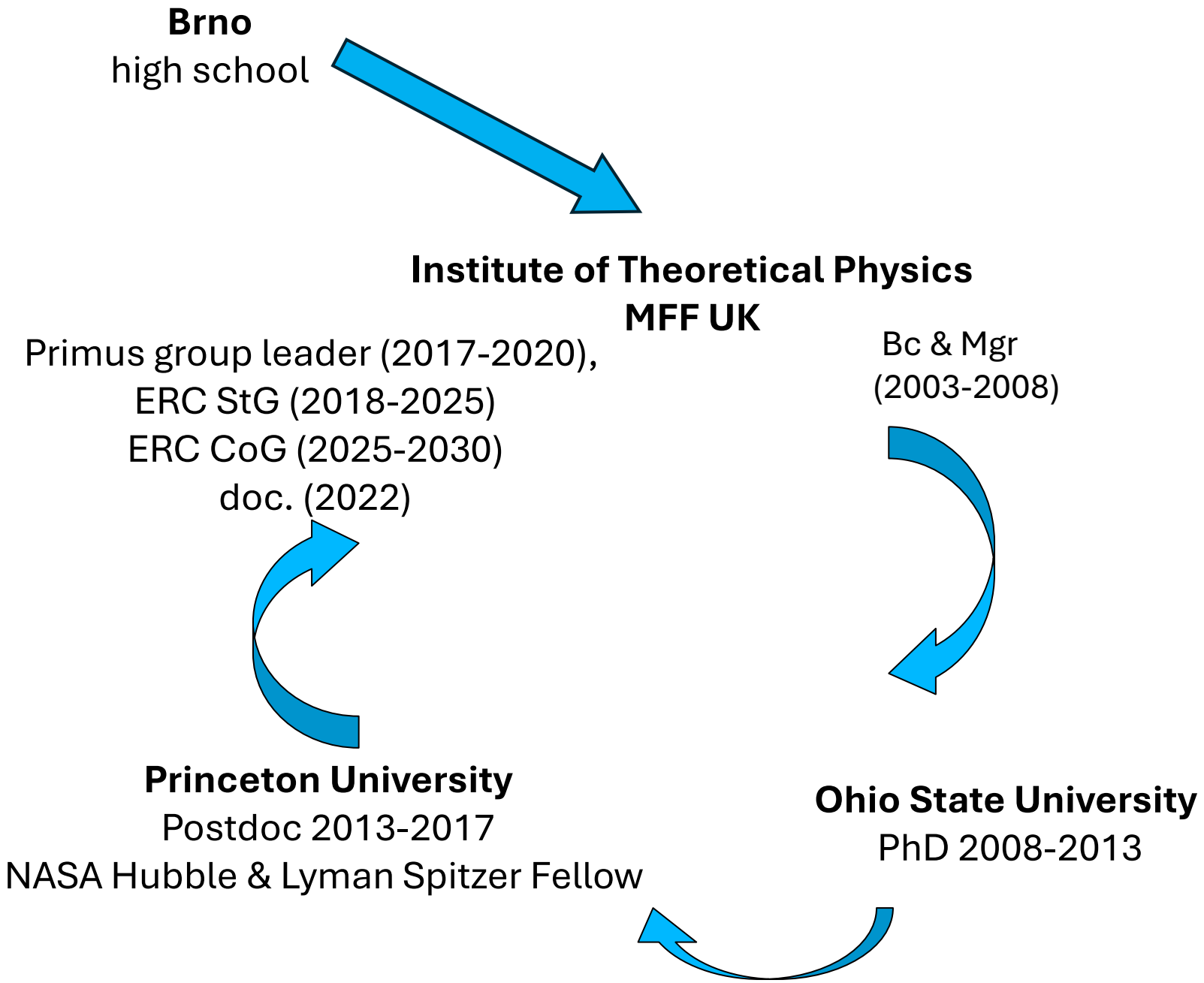

Brno
high school
Institute of Theoretical Physics
MFF UK
Bc & Mgr
(2003-2008)
Ohio State University
PhD 2008-2013
Princeton University
Postdoc 2013-2017
NASA Hubble & Lyman Spitzer Fellow
Primus group leader (2017-2020),
ERC StG (2018-2025)
ERC CoG (2025-2030)
doc. (2022)

Astrophysics

- Observations of variable stars (high school)
- Gravitational microlensing of binary stars (Bc/Msc)
- Supernovae and other time-variable objects (PhD)
- Supernovae and computer simulations of binary stars (postdoc)
- Computer simulations of violent binary stars (ERC Cat-In-hAT)
- Computer simulations of calm binary stars (ERC ROGALLO)

Why did I apply for ERC?

In ~2016:

- Postdoc ends, I need to apply for everything
- Huge pot of money to do my stuff
- Famous people in my field got it before
- Academia in Czechia clearly cares about it

In ~2023:

- one of very few ways in CZ how I can do my science in a way I think is right

What was my path to ERC?

Attempt 1 (2016):
“traditional” proposal

= unsuccessful (B after interview)

Attempt 2 (2017):
new proposal with recycled parts

Very high risk (and high gain), development of new methods

Attempt 3 (2023):
Completely new proposal

Development of new method, pivot in topic

ERC buys me this shine new machine and/or huge team of people to work on my ideas and papers+citations will just keep coming

vs

I can use ERC to build something completely new that would be so cool to have for many reasons, but it’s pretty likely I will fail

How long did the preparations take?

Attempt 1 (2016):
“traditional” proposal

= unsuccessful (B after interview)

~ couple weeks: effectively reformatting the proposal I was sending everywhere at that time

Attempt 2 (2017):
new proposal with recycled parts

Very high risk (and high gain), development of new methods

~ week of thinking and ~few weeks of writing

Attempt 3 (2023):
Completely new proposal

Development of new method, pivot in topic

~2 years of low-level thinking, ~year of low-level discussions with colleagues worldwide , ~4 weeks of intense writing

How was the interview?

Attempt 1 (2016):
“traditional” proposal

= unsuccessful (B after interview)

Some questions on why is approach different from others → enthusiastic hope for positive outcome

Attempt 2 (2017):
new proposal with recycled parts

Very high risk (and high gain), development of new methods

Questions on how I’ll lead the team and to repeat some aspects of the proposal → pessimistic thoughts

Attempt 3 (2023):
Completely new proposal

Development of new method, pivot in topic

Questions on technical details, finding team members and why I’m not going to fail unlike previous attempts → pessimistic thoughts

Thoughts for project support/ institution management

Dos:

- Detailed checks of application formalities
- Have answers for: “I want to buy X with these constraints; how do I do that?”
- Please fill cell K22 in this spreadsheet, print and sign
- I don’t even want to know about certain problems…

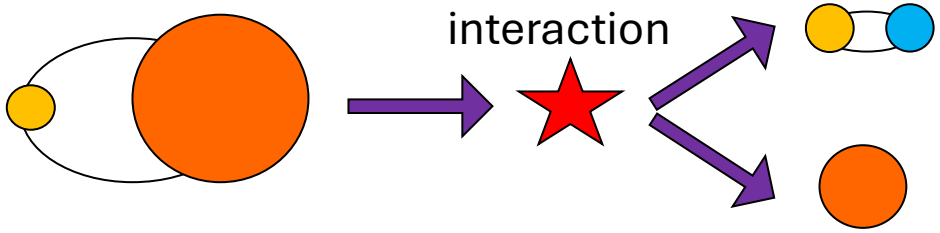
Don’ts:

- Congratulations, but “your money, your problems”
- Hiring so many team members? Let’s get you offices very far from everybody else
- Your grant ends in three years? Sure you shouldn’t hire a PhD student! (no support after grant ends)

StG: What is the physics of catastrophic binary interactions?

Cat-In-hAT

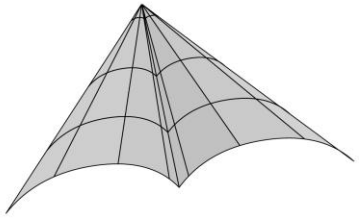
European Research Council



Sources of gravitational waves

Weird single objects

What happens to the **orbital energy** of the binary star?
What is the **physics** of the brightening?
How are **magnetic fields** amplified?



CoG: ROGALLO

Answer fundamental questions concerning binary systems involving stars, planets, neutron stars, and black holes with previously unachievable (magneto)hydrodynamical simulations.

European Research Council

Circumbinary disks

Pulsations of tidally-deformed stars

Chemically homogeneous evolution of gravitational wave progenitors

Mass transfer flows and outflows

Classical nova explosions

Supernova explosions in binaries

Bodies moving through fluid