

# **asymptotics in astrophysics iTHEMS workshop**

**Tuesday 25 February 2025 - Friday 28 February 2025**

**Integrated Innovation Building (IIB)**

## **Scientific Programme**

**Daily themes**

Tuesday: Theoretical physics (Kelly, Honda)

Wednesday: Black hole quasinormal modes (Oshita, Chen, Namba)

Thursday: Asteroseismology (Takata, Shimada)

Friday: Stellar hydrodynamics and supernovae (McNeill, DuPont)

**Daily Timetable**

9:30am~ Morning session 1

~10:45am coffee break

11:15am~ Morning session 2

~12:30pm Lunch (Tuesday, Wednesday on site buffet)

2:00pm~ Afternoon session 1

~3:15pm Coffee break

3:45pm~ afternoon session 2

~5:00pm Evening session

8:00pm workshop close

| **Theoretical physics**|**Black hole quasinormal modes**|**Stellar oscillations, asteroseismology**  
|**Stellar hydrodynamics**|

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[9:30am-10:45am]|Christy Kelly *Foundations of asymptotics and perturbation theory*|Naritaka Oshita  
*Introduction to black hole quasinormal modes*|Masao Takata *History and status of*  
*asteroseismology*|Lucy McNeill *Buoyancy wave transport in evolved massive stars*

[10:45am - 11:15am]|Coffee break|Coffee break|Coffee break|Coffee break|

[11:15-12:30pm]|Tutorial / demonstration *Fundamental physics results from asymptotics*|Tutorial /  
demonstration on *Numerical computation of QNM frequencies*|Tutorial / demonstration  
(TBD)|Tutorial / demonstration (TBD)|

[12:30pm - 2pm]|Discussion lunch|Discussion lunch|Lunch outside|Lunch outside|

[2pm - 3:15pm]|Masazumi Honda *Resummations of divergent series*|Che-Yu Chen *black hole*

*shadows and eikonal QNMs*|Ryota Shimada *Detected magnetic fields in the cores of red giants by asteroseismology and models to interpret them*|Marcus DuPont *Asymptotics in hydrodynamics solvers (title TBC)*

|3:15pm-3:45pm|Coffee break|Coffee break|Coffee break|Coffee break|

|3:45pm - 5:00pm|Tutorial / demonstration Application of resurgence|Ryo Namba Exact WKB method application to black hole QNMs\*|Tutorial / demonstration (TBD)|Tutorial / demonstration (TBD)|

|5:00pm - 8pm|Poster session|Discussion|Banquet| |

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