

# Astronomy & Astrophysics Problems from International Physics Olympiads

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## 1 Relevant Problems from Physics Olympiad

Here are all the International Physics Olympiad problems that are relevant to Astronomy and Astrophysics Olympiads.

<b>IPhO:</b>	<b>APhO:</b>	2017 T1
2025 T1	2025 T1, T3	<b>Physics Cup</b>
2024 T1, T3	2024 T3	2025 P5
2023 T2	2023 T1	2024 P4
2022 T2	2019 T2	2021 P2
2018 T1	2018 T2	
2017 T1, T3	2017 T2, T3	
2015 T1	2016 T2	<b>NBPhO:</b>
2012 T3	2015 T2	2025 P8
2011 T1	2014 T3	2024 P4
2009 T1, T3	2013 T2	2023 P3
2007 T1, T3	2012 T2	2022 P3, P8
2006 T1, T3 (i)	2008 T3	2021 P1
2005 T1	2003 T1	2019 P1, P6
2001 T2	2001 T1	2018 P1
2000 T3	2000 T1	2017 P4, P9
1999 T3	<b>WoPhO:</b>	2013 P3
1997 T3	2013 T3, T4, T9	2012 P1
1996 T3	2012 T10	2010 P7
1995 T1	2011 T6	2008 P9
1992 T1, T3	<b>GPhO:</b>	2007 P7
1990 T3		2005 P3
1985 T3		2004 P2
1981 T1, T3	2016 T2, T3	2003 P3, P7
1979 T1, T3		

## 2 Problems by Topic

### 2.1 Mechanics & Celestial Mechanics

#### IPhO

IPHO 1985 - Theory Problem 3 - Escaping the Solar System  
IPHO 1992 - Theory Problem 1 - A Rotating Satellite  
IPHO 1997 - Theory Problem 3 - Solar Powered Aircraft  
IPHO 2005 - Theory Problem 1 - An ill Fated Satellite  
IPHO 2009 - Theory Problem 1 - Evolution of the Earth-Moon System  
IPHO 2011 - Theory Problem 1 - A Three-body Problem and LISA

#### APHO

APHO 2017 - Theory Problem 2 - Part A : Dynamic Friction

IOM 2020 - Theory Problem 2 - To The Sun !

### 2.2 Cosmology

#### IPhO

IPHO 2017 - Theory Problem 3 - Cosmic Inflation

#### APhO

APHO 2016 - Theory Problem 2 - The Expanding Universe

APHO 2024 - Theory Problem 3 - First Discovered Quasar

IOM 2019 - Theory Problem 1 - Newton-Laplace Cosmology

### 2.3 Stellar Physics

#### IPHO

IPHO 2012 - Theory Problem 3 - Protostar Formation  
IPHO 2009 - Theory Problem 3 - Why are Stars so Large?  
IPHO 2007 - Theory Problem 3 - Photometry of Binary Stars

#### APHO

APHO 2012 - Theory Problem 2 - Chandrasekhar Limit

GPHO 2016 - Theory Problem 3 - Magnetars

GPHO 2017 - Theory Problem 1 - Main Sequence Stars

IOM 2018 – Theory Problem 3 – In a Galaxy Far, Far Away...

### 2.4 Thermodynamics

#### IPhO

IPHO 1992 - Theory Problem 3 - A Satellite in Sunshine

IPHO 2012 - Theory Problem 3 - Protostar formation

## 2.5 Galactic Astrophysics and Blackhole

### IPHO

IPHO 2007 - Theory Problem 1 - Black Hole

IPHO 2017 - Theory Problem 1 - Dark Matter

### APHO

APHO 2014 - Theory Problem 3 - Gravitational Lensing

APHO 2017 - Theory Problem 1 - Dark Matter

APHO 2019 - Theory Problem 2 - X-ray Jets from Active Galactic Nuclei

## 2.6 Graviational Wave

### IPHO

IPHO 2018 - Theory Problem 1 - LIGO-GW150914

GPHO 2016 - Theory Problem 2 - Gravitational Wave

## 3 References

1. Past International Physics Olympiad (IPhO) Questions
2. Past Asian Physics Olympiad (APhO) Questions
3. Past Questions from GPhO, Physics Cup, WoPhO, and NBPhO
4. Handouts by Kevin Zhou
5. Resource Compilation by the Thailand IOAA Team

## 4 Remarks

This document is intended for open use to support anyone preparing for Astronomy and Astrophysics Olympiads. If you find any mistakes or would like to suggest corrections, please contact me on Discord (wizzy\_wiz).