

**Dr. Dimitrie Culcer** week 1-4

**A/Prof. C. Ulrich** week 5-8

|      |               |                   |
|------|---------------|-------------------|
| Mo.  | 11:00 - 12:00 | Old Main Building |
| Wed. | 17:00 - 18:00 | Old Main Building |
| Thu. | 13:00 - 14:00 | Old Main Building |
| Fri. | 16:00 - 17:00 | Old Main Building |

**Email Address**

ulrich@phys.unsw.edu.au



**Office Hour:**

Monday: 14.00 - 15.00

Room: OMB - 125

## School of Physics



High School

Future Students

Current Students

People & Contacts

Research

News

Events

About

Physics

CLEMENS ULRICH GROUP

Nothing posted yet.

RESEARCH GROUP



Associate Professor

CLEMENS ULRICH GROUP

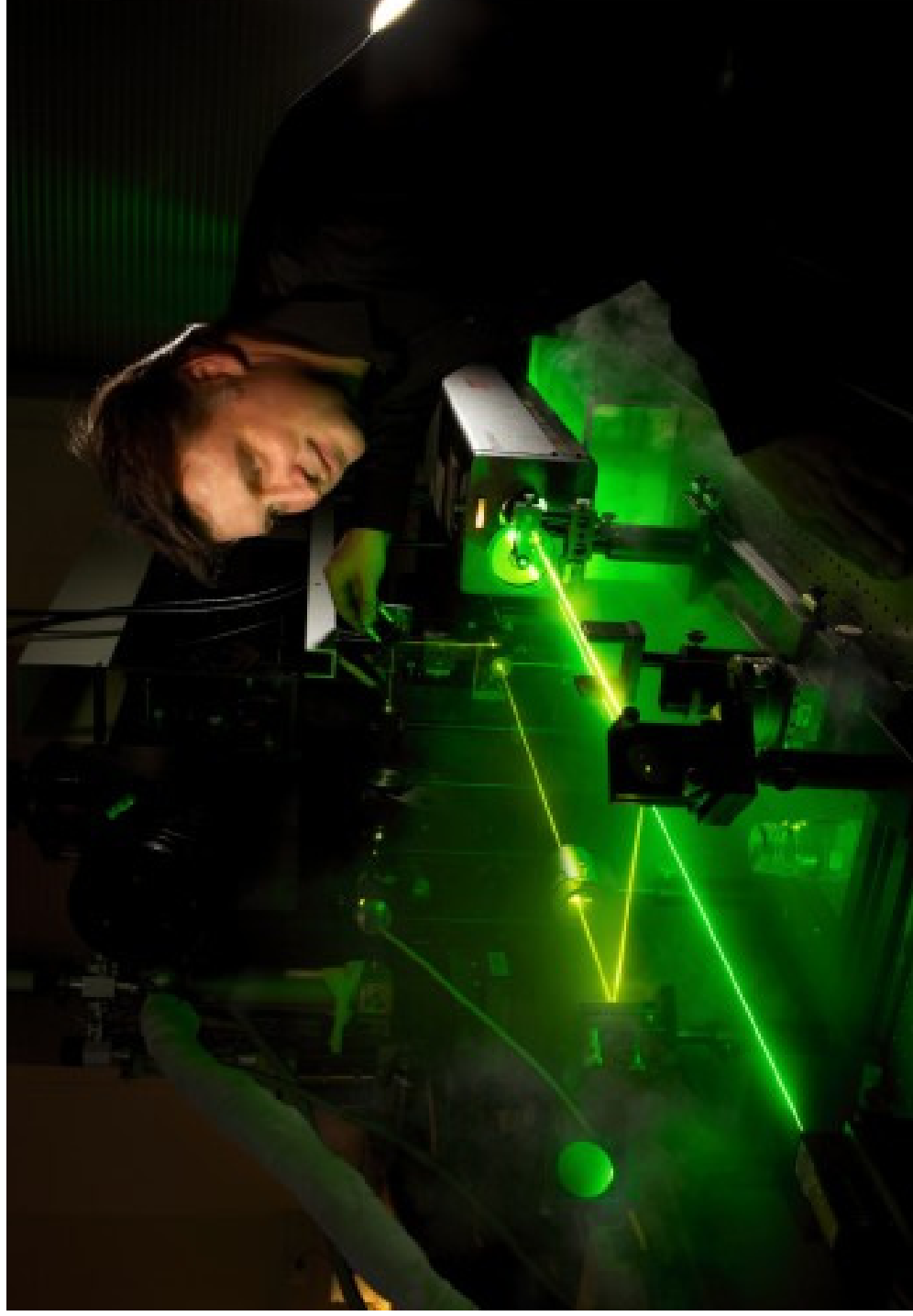
CONTACT CLEMENS

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# PHYS 1121 – PHYS 1131



## PHYS 1121 – PHYS 1131

### Textbook Reference

Fundamentals of Physics

Halliday, Resnick and Walker

Wiley

Fundamentals of Thermodynamics

Borknakke and Sonntag

Wiley

*and many more*

**TOPIC 2: *Thermal Physics***

- **TEMPERATURE** (§18.1 – 18.3)  
Heat, temperature and thermal equilibrium; absolute zero; thermal properties of matter; measuring temperature, specific and latent heats.
- **KINETIC THEORY OF GASES** (§19.1 – 19.9)  
Macroscopic properties of a gas and the ideal gas law; molecular model of the ideal gas; kinetic interpretation of temperature; mean free path; the distribution of molecular speeds; molar specific heats; adiabatic processes; equipartition of energy.
- **HEAT AND THE FIRST LAW OF THERMODYNAMICS** (§18.4 – 18.6)  
Energy transfer mechanisms in thermal processes; work and internal energy; work and heat in thermodynamic processes; the First Law of Thermodynamics.

## *TOPIC 3: Waves*

- **OSCILLATIONS** (§15.1 – 15.6)  
Oscillating systems; Simple Harmonic Motion, including energy of oscillations; Examples, including uniform circular motion, pendulums; Damped and forced oscillations (qualitative only).
- **WAVE MOTION** (§16.1 – 16.5, 16.7)  
Propagation of a disturbance; travelling waves; wave speed; reflection and transmission; power and intensity in wave motion; the principle of superposition; interference of waves; standing waves.
- **SOUND WAVES** (§17.1 – 17.8)  
The speed of sound; pressure variations; travelling longitudinal waves; power, intensity and level of sound waves; interference; the Doppler effect; resonance; standing longitudinal waves; beats; shock waves

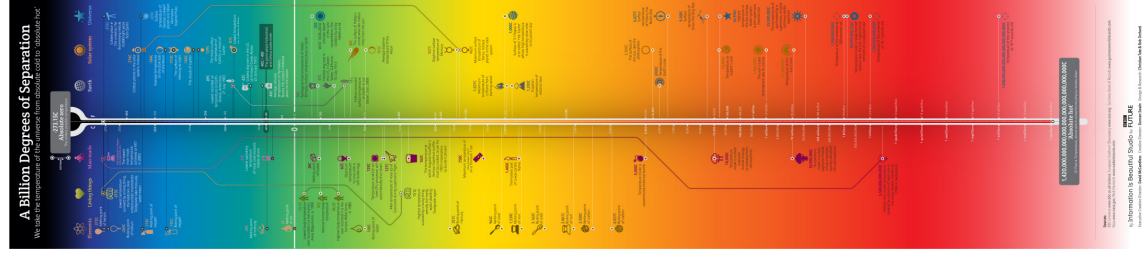
## PHYS 1121 – PHYS 1131

**What is**

**TEMPERATURE?**

Sec 18.1 - 18.3

THE UNIVERSITY OF NEW SOUTH WALES



<https://www.sciencealert.com/the-hottest-and-coldest-temperatures-according-to-physics>

**0 K = -273.15°C**

**Absolute Zero**

**$5 \times 10^{-10}$  K**

**Bose Condensation (Sodium atoms)**

**-89.2°C (184 K)**

**Soviet Vostek Station 21. July 1983**

**0°C (273.15 K)**

**Melting point of water ice**

**100°C (373.15 K)**

**Boiling point of water**

**$1.5 \times 10^8$  K**

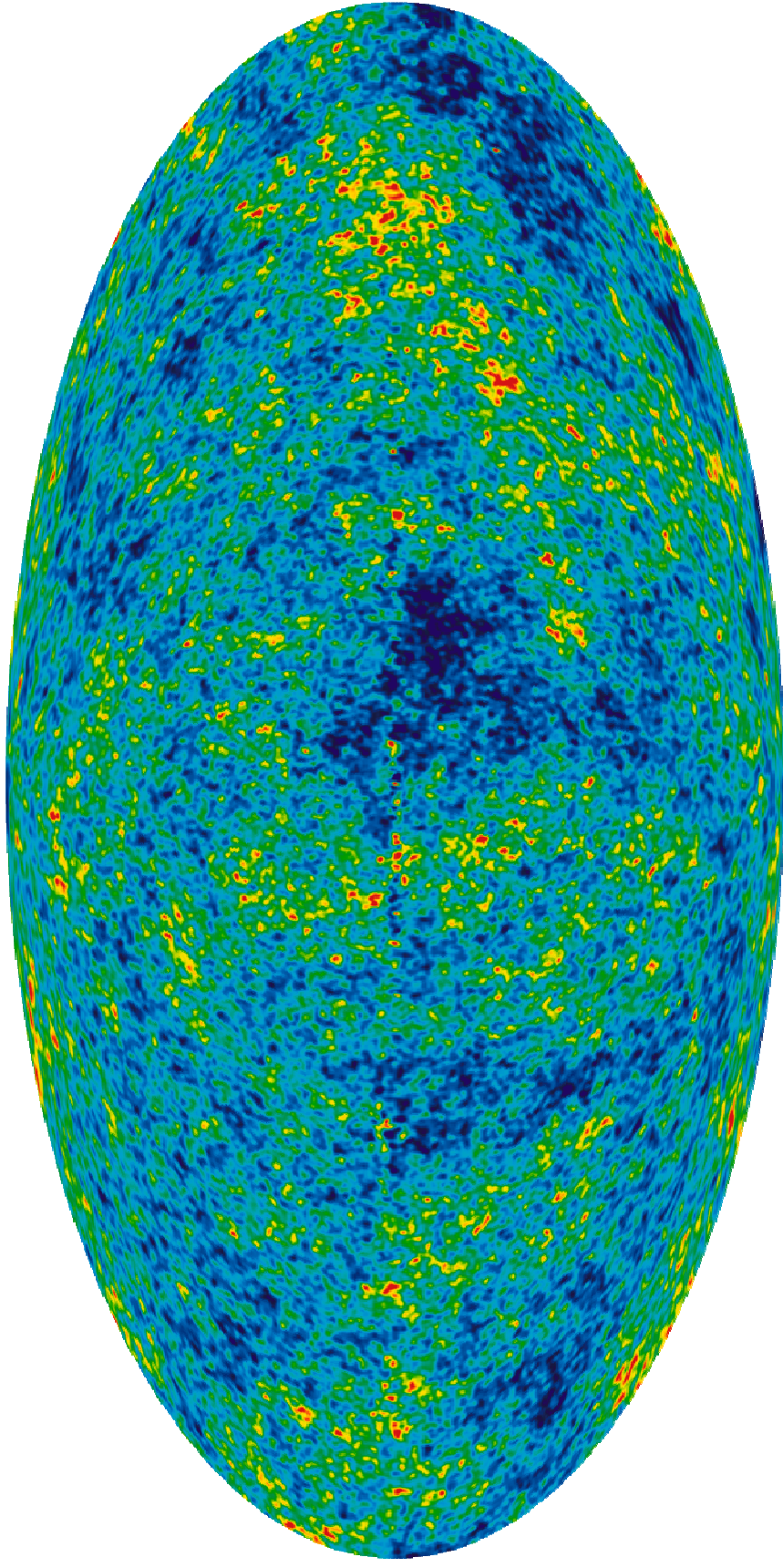
**Plasma temperature of ITER**

**$1.42 \times 10^{28}$  K**

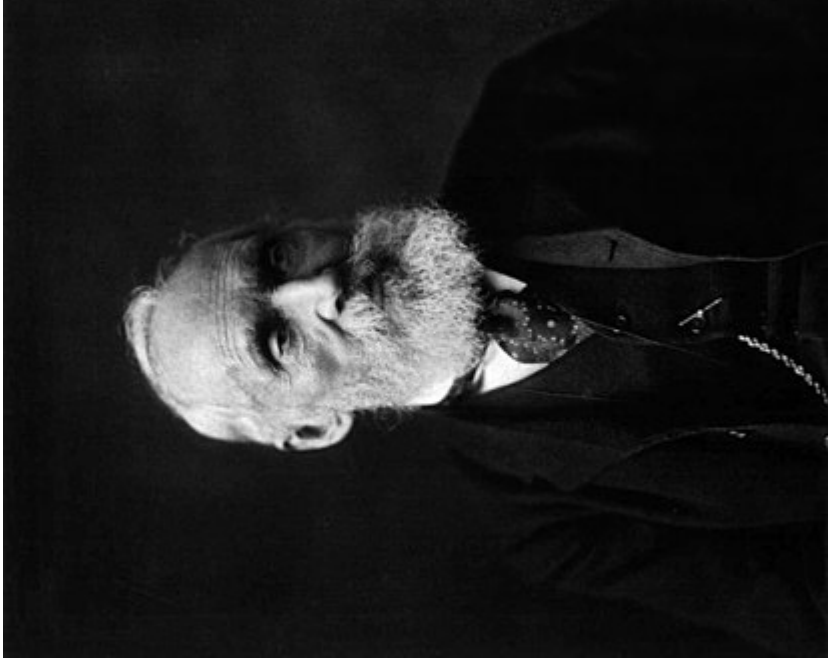
**Temperature of the Big Bang**

**Reached by Humans: 18 orders of magnitude**

**In the Universe: 38 orders of magnitude**



**Cosmic Microwave Background**  
thermal black body spectrum of  $2.72548 \pm 0.00057$  K



## **Lord Kelvin**

**William Thomson, 1<sup>st</sup> Baron Kelvin,**

**26 June 1824 – 17 December 1907**

**Belfast      Scotland**

**University of Glasgow**