



## Syllabus for USAPhO Crash Course

### (USAPhO 考前冲刺班教学大纲)<sup>1</sup>

PROFESSOR CHEN EDUCATION PALACE (陈教授教育学院)

#### OBJECTIVES (教学目标)

Qualify for the USA training camp for IPhO.

(晋级IPhO美国国家集训队)

#### Duration (总课时)

24 Hours (24小时).

#### TEXTBOOKS (教材)

We use our developed course packet (我们用自己编写的教材).

#### COURSE CONTENTS (教学内容)

##### Module 0: Math preparation (第零模块：数学准备)

1. Vector calculus (向量微积分)

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## 2. Linear algebra (线性代数)

### **Module 1: Mechanics (第一模块：力学)**

1. Non-inertial reference frames (非惯性参考系)
2. Lagrangian mechanics (拉格朗日分析力学)
3. Oscillations (振动)

### **Module 2: Thermodynamics (第二模块：热力学)**

1. Kinetic theory (分子运动理论)
2. Laws of thermodynamics (热力学定律)
3. Surface tensions (表面张力)

### **Module 3: Electricity and Magnetism (第三模块：电磁学)**

1. Electrostatics (静电场)
2. Magnetism (磁场)
3. Faraday's law of induction (法拉第电磁感应)
4. Maxwell's equations (麦克斯韦方程)
5. Circuits (电路)

### **Module 4: Waves and Optics (第四模块：波动和光学)**

1. Properties of waves (波的性质)
2. Doppler effect (多普勒效应)
3. Interference, diffraction, polarization (干涉，衍射，偏振)

### **Module 5: Special Relativity (第五模块：相对论)**



1. Lorentz transformation (洛伦兹变换)
2. Relativistic kinematics (相对论运动学)
3. Relativistic dynamics (相对论动力学)

