**本次竞赛题目**

采用2018年第31届IYPT问题中的10个，保留原序号。

**1. Invent Yourself**

Construct a simple seismograph that amplifies a local disturbance by mechanical, optical or electrical methods. Determine the typical response curve of your device and investigate the parameters of the damping constant. What is the maximum amplification that you can achieve?

**2. Color of Powders**

If a colored material is ground to a powder, in some cases the resulting powder may have a different color to that of the original material. Investigate how the degree of grinding affects the apparent color of the powder.

**3. Dancing Coin**

Take a strongly cooled bottle and put a coin on its neck. Over time you will hear a noise and see movements of the coin. Explain this phenomenon and investigate how the relevant parameters affect the dance.

**5. Drinking Straw**

When a drinking straw is placed in a glass of carbonated drink, it can rise up, sometimes toppling over the edge of the glass. Investigate and explain the motion of the straw and determine the conditions under which the straw will topple.

**7. Conical Piles**

Non-adhesive granular materials can be poured such that they form a cone-like pile. Investigate the parameters that affect the formation of the cone and the angle it makes with the ground.

**9. Candle in Water**

Add some weight to a candle such that it barely floats in water. As the candle burns, it may continue to float. Investigate and explain this phenomenon.

**11. Azimuthal-Radial Pendulum**

Fix one end of a horizontal elastic rod to a rigid stand. Support the other end of the rod with a taut string to avoid vertical deflection and suspend a bob from it on another string (see figure). In the resulting pendulum the radial oscillations (parallel to the rod) can spontaneously convert into azimuthal oscillations perpendicular to the rod) and vice versa. Investigate the phenomenon.

**13. Weighing Time**

It is commonly known that an hourglass changes its weight (as measured by a scale) while flowing. Investigate this phenomenon.

**14. Radiant Lantern**

When taking a picture of a glowing lantern at night, a number of rays emanating from the center of the lantern may appear in the pictures. Explain and investigate this phenomenon.

**16. Acoustic Levitation**

Small objects can levitate in acoustic standing waves. Investigate the phenomenon. To what extent can you manipulate the objects?

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