



# **International Young Naturalists' Tournament**

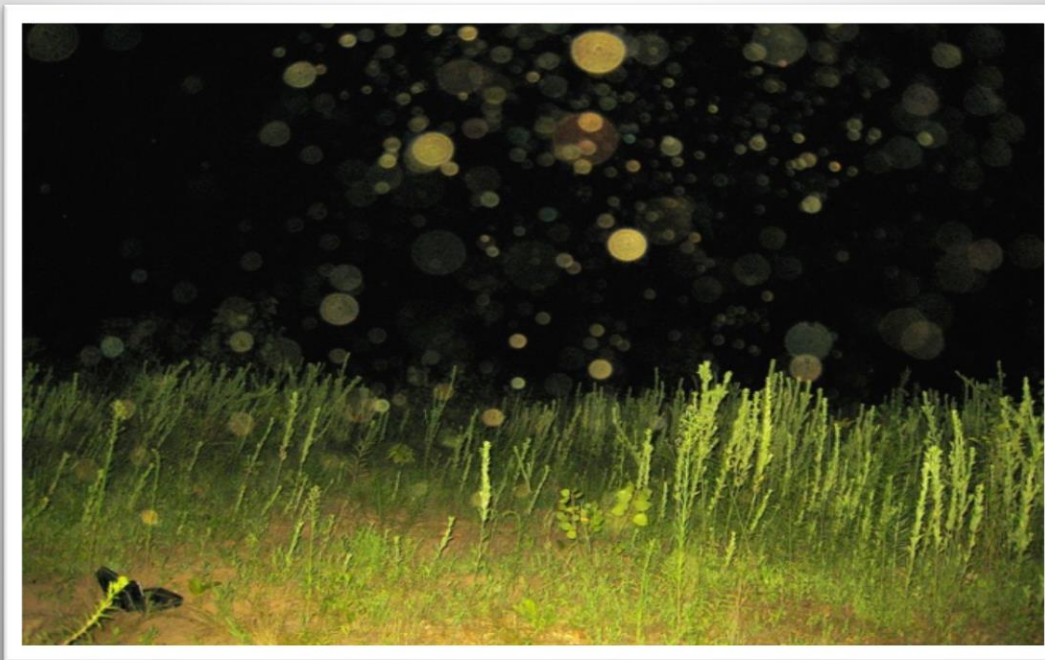
## **13. Shining orbs**

**Serbian team 1**

**Regional Center For Talented Youth**

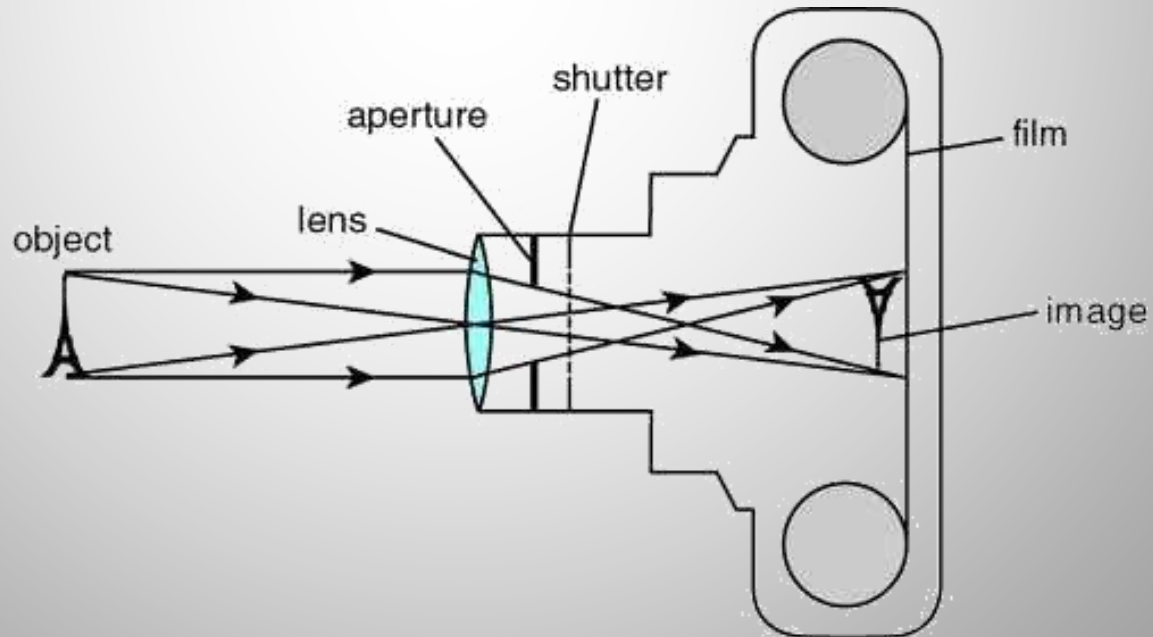
# 13. Shining orbs

➤ Bright and rather unexpected white disks may appear in a photo taken with a flash in a dark room. Explain why such shining orbs appear in the photos.

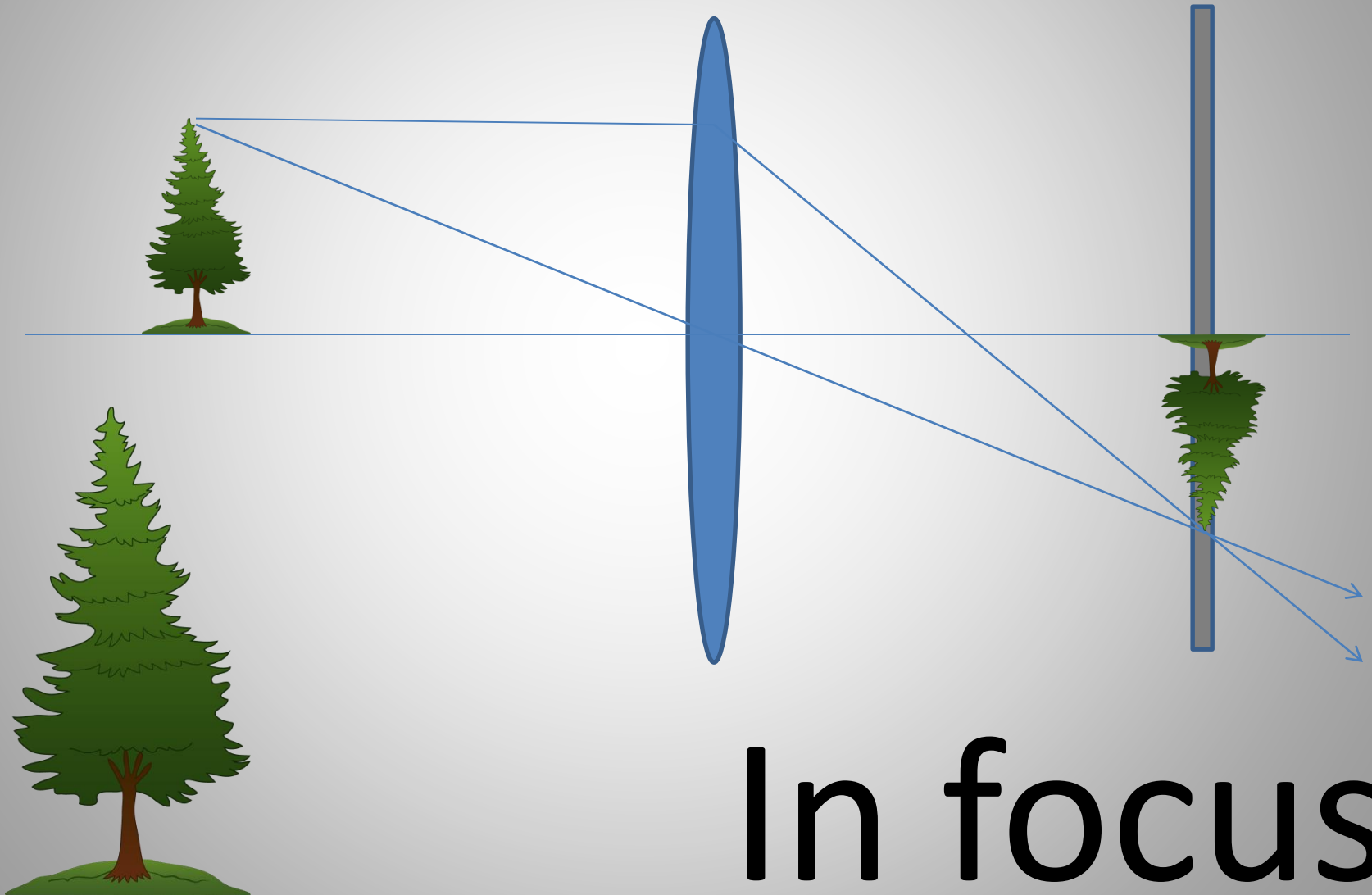


# How does a camera work?

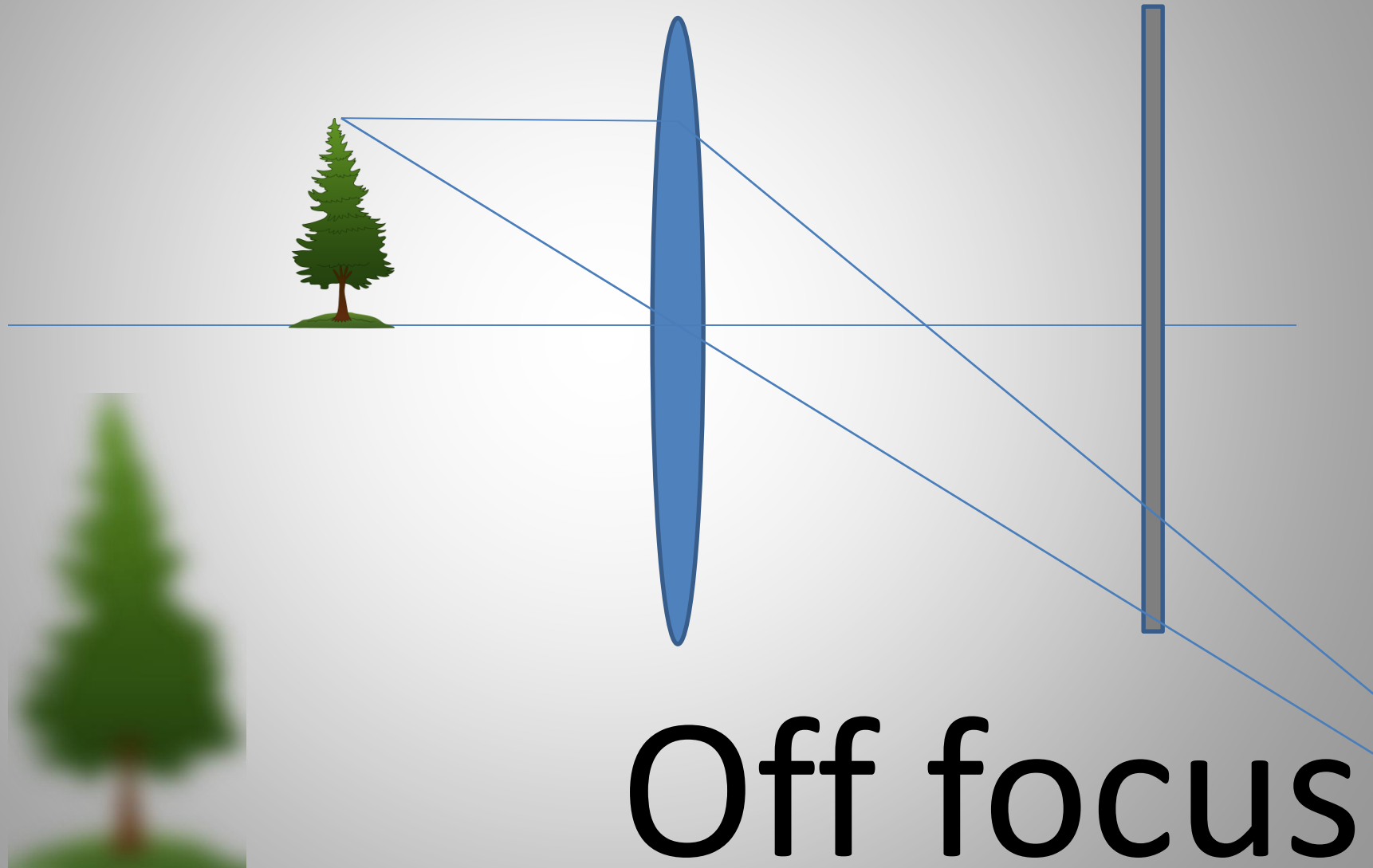
- Device that captures the image of an object
- Image is formed by using lenses
- Lenses focus the object creating sharp and defined picture



# How does a camera work?



# How does a camera work?



# What are shining orbs?

- Unexpected, usually circular artifacts that occur in the photos when small particle is close to the lens, and strongly shined by light
- Off focus = Blurred
- Close = Larger
- Shined by light = Very bright





# Particles

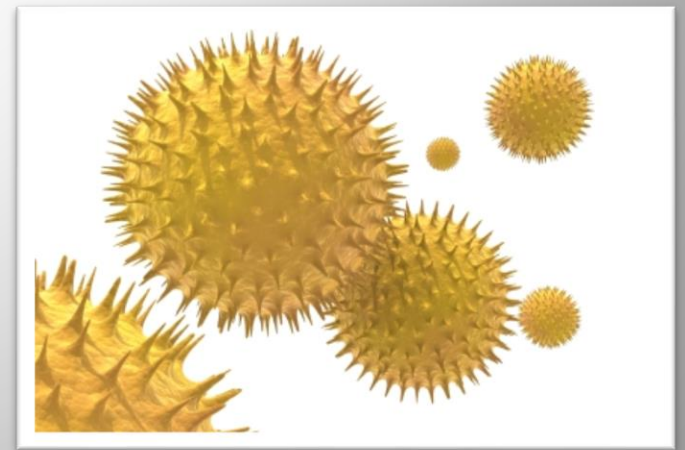
## Liquid

- Water droplets (rain)
- Mist



## Solid

- Dust
- Pollen
- Insects
- Sand
- Snowflakes



# In which conditions do they appear?

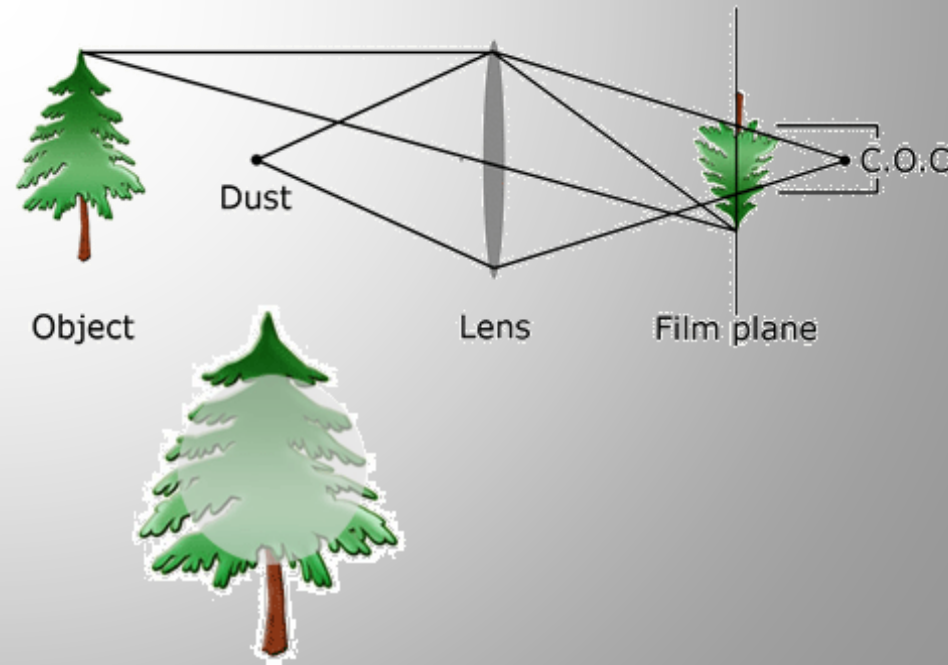
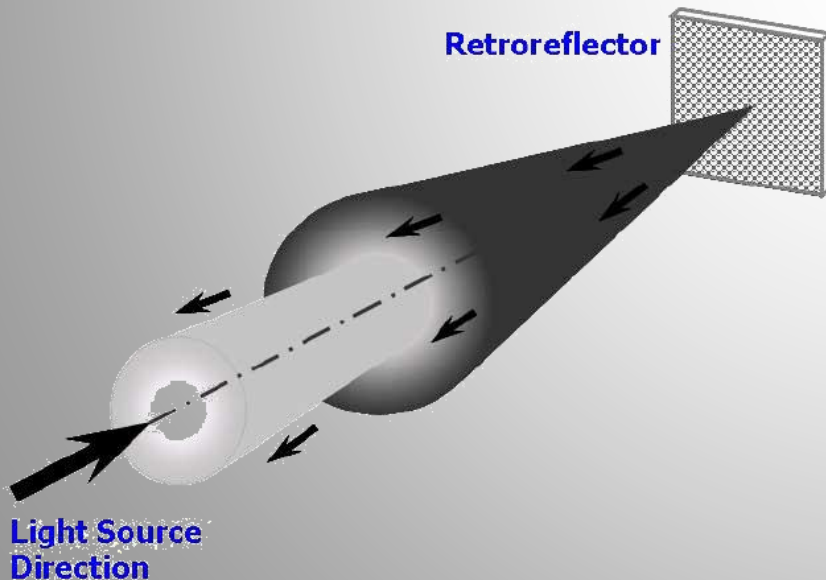
- They appear in dark surrounding because of using flash
- Can appear anywhere only if flash is used





# Why do they appear in the photos?

- The flash illuminates particles that are drifting very close to it
- Retro reflection
- “The circle of confusion”



# Examples

## Experiment 1:

- Dirt particles in focus
- 3 inches
- No shining orbs



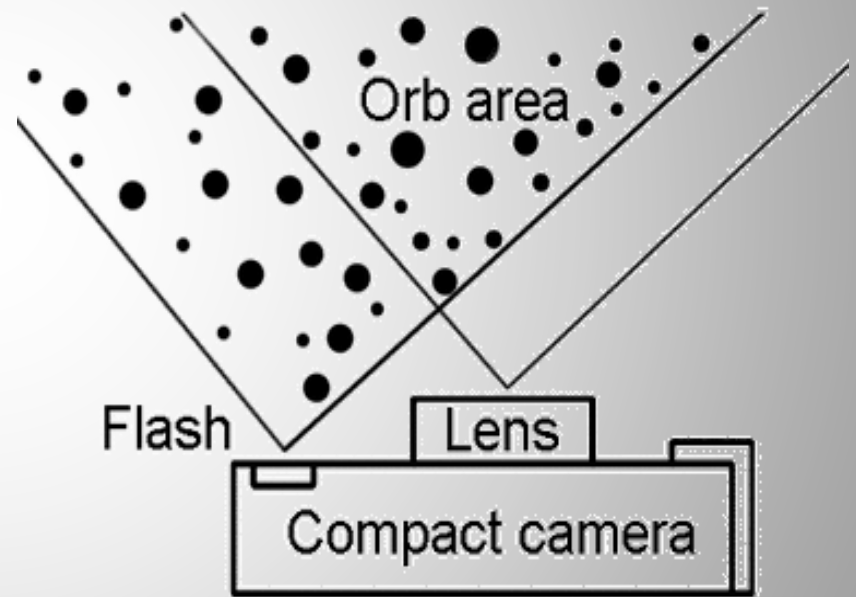
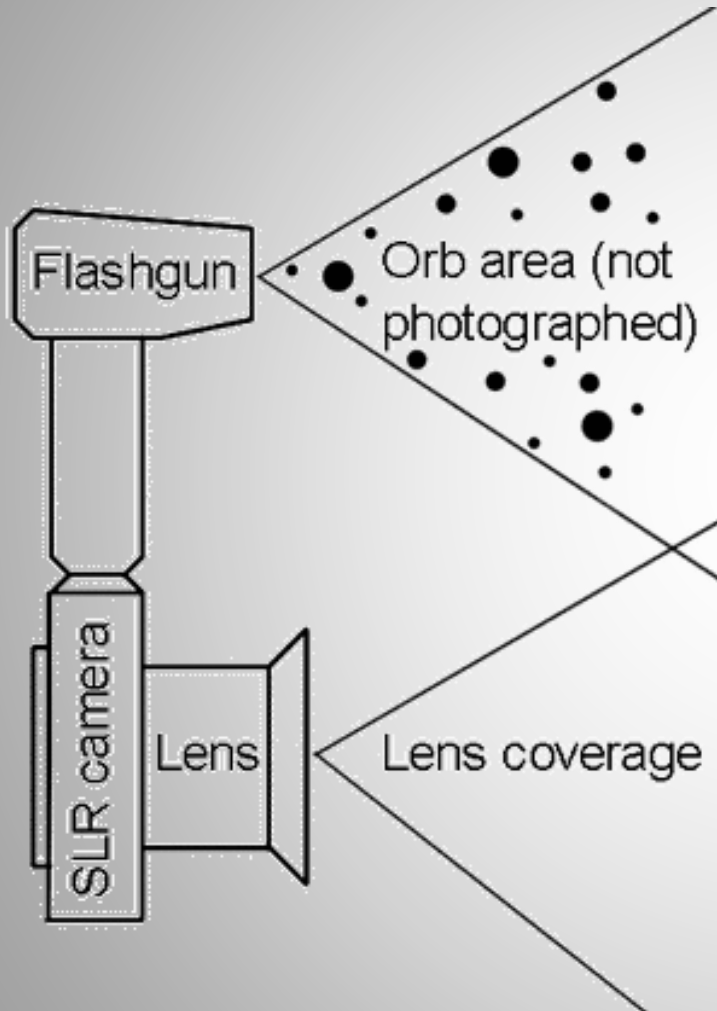
# Examples

Experiment 2:

- Dirt particles off focus
- 3 inches
- Shining orbs



# Remark













# Thank you for your attention!!!



Shining orbs = Ghosts??? :D