







### Follow the Dreams

In the "War of Worlds" (1898) H. G. Wells imagined Martial invaders scattering human armies with devastating heat rays.



### **Stimulated Emission**

A method for amplifying light had its origins in an idea Einstein developed in 1916. Looking deeply into the new theory of quantum physics, he predicted that rays could stimulate atoms to emit more rays of the same wavelength. But engineers had little notion how to manipulate atoms, and for decades the idea seemed a theoretical curiosity of no practical interest.



# Follow the Money

When the Soviet Union launched the first satellite Sputnik in 1957, the US government redoubled its funding for research.

Might scientists invent a ray device to shoot down enemy missiles?



### Maser: First Step to the Laser

- In 1953, Charles Townes, James Gordon and Herbert Zeiger produced the first MASER → Incapable of continuous output.
- Nikolay Basov and Aleksander Prokhorov solved the problem of continuous-output systems by using more than two energy levels.







## The Patent War

- In 1957 **Townes** talked over some ideas about pumping lightenergy into atoms with **Gordon Gould**.
- Worried that he might be scooped, **Gould** wrote down his ideas for the record and in April 1959 he filed patent applications.
- Nine months earlier **Schawlow** and **Townes** had applied for a patent.
- When the patent application of **Townes et al**. was granted, **Gould** sued, claiming he was first to conceive the device.
- In 1987 **Gould** and his backers began to win settlements. One of the greatest patent wars in history was over.

The historical question of how to assign credit for inventing the laser remains controversial!!

### The First Laser

- **Theodore Maiman** developed the first working laser at Hughes Research Lab in 1960.
- Theodore Maiman used a solidstate flashlamp-pumped synthetic ruby crystal to produce red laser light, at 694 nanometers wavelength.



11







# LASER THEORY on WEB

Please check https://anis.buet.ac.bd/Laser\_Theory.html for class notes, home work, grades, and other updates.

### **Class Email List**

17

18

- To get included in the list, email to <u>anis@eee.buet.ac.bd</u> with
  - Subject: EEE 6503
  - Body: "Your Name, Student Number" <email address>
- It will help me to keep you posted on the course updates.











































