

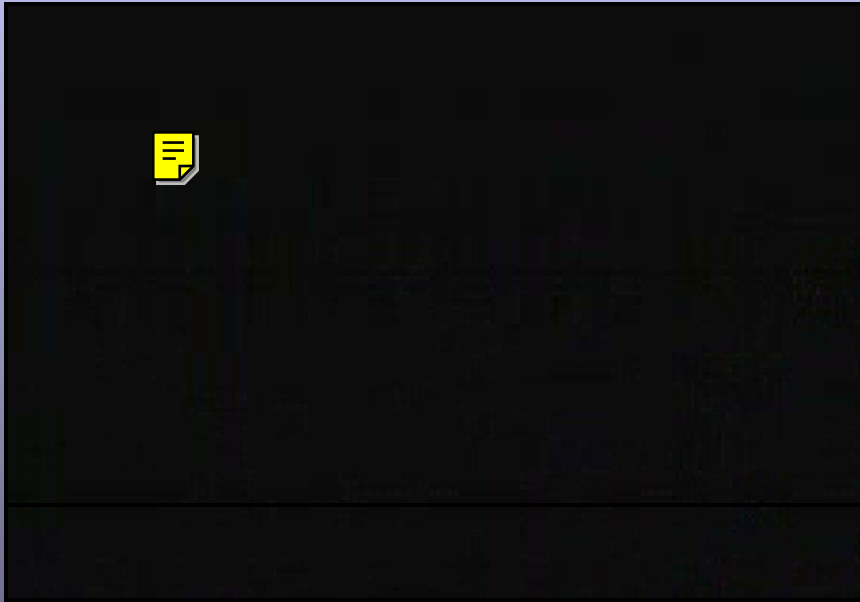
Physics at the Movies

Analytical review of the scientific concepts and ideas behind popular movies.

Introduction

- Even though people are living in a world surrounded by technology and the science, it is rare for them to discuss or wonder about how things are done scientifically.
- The general public does not pay much attention to how things work or to how far scientists are progressing.

The Power of Film!



- Ability to reach all.
- To convey scientific concepts as part of an exciting plot.
- To explore new ideas and concepts
- To involve and carry along the audience in a world of sight and sound.

Project Aims

- To review and analyse the scientific concepts behind some popular films.
- To analyse specific scenes within films where science is explained.
- To look at the science from an average viewers perspective.
- To investigate whether there is a common thread of “bad” science in films.
- To look into film as a medium for conveying correct science to the public.

Method and Methodology

- Initial ideas and concepts
- How we carried out the project
- What we will be looking for when analysing the films

It will require all our knowledge gained in studying undergraduate and A-level physics.

When studying the films we have to:

- Establish the type of science behind the facts
- Ascertain their accuracy within the limits that the film plot requires
- Verify any calculations done in the film
- Decide if any discrepancies are plot driven or just mistakes
- Use relevant literature to back up our theory

We split the analyses of the films up into two categories;

- Physics perspective
- Viewers' perspective

PHYSICS PERSPECTIVE

- What type of science is it?
- Is the science correct?
- Review of the fundamental principles behind the science as quoted in the film

VIEWERS' PERSPECTIVE

- What is the target audience?
- Would the audience understand it?
- Could the science content have been made shorter or longer?
- Is the science explained elsewhere in the film?
- Is the viewer meant to understand the science involved?

A number of common points and similarities between the ‘scientific facts were looked for when looking at all of our reports. These included;

- Is the science present in the same way in different films?
- Is there a pattern of ‘scientific errors’ within the explanation, throughout the films?
- Is there a pattern to the use of science?
- Does it fit into two categories 1) to help the plot line? 2) to help the action?

Bond Gadgets: X-ray glasses



007 picks up this pair of blue sunglasses in Q's lab. Both stylish and functional, their X-ray ability allows Bond to wander through a casino viewing concealed weapons and inspecting ladies' lingerie.

Could they work though?

- No! Technology is not advanced enough.
- Although, X-rays are important in security technology.
- They will reveal metal objects like knives, guns, maybe even bra fasteners - though not the bra itself!
- It requires the subject to be stationary for a few seconds in order to work properly.

Underwater Breather



Allowed Bond enough oxygen to breathe underwater for approximately 4 minutes.

Could it work?

NO! You would need a much bigger tank.

Accurate scientific facts

- This movie is a very good example of accuracy in the scientific facts
- Very few little mistakes and one big one
- Can be forgiven as it is plot driven



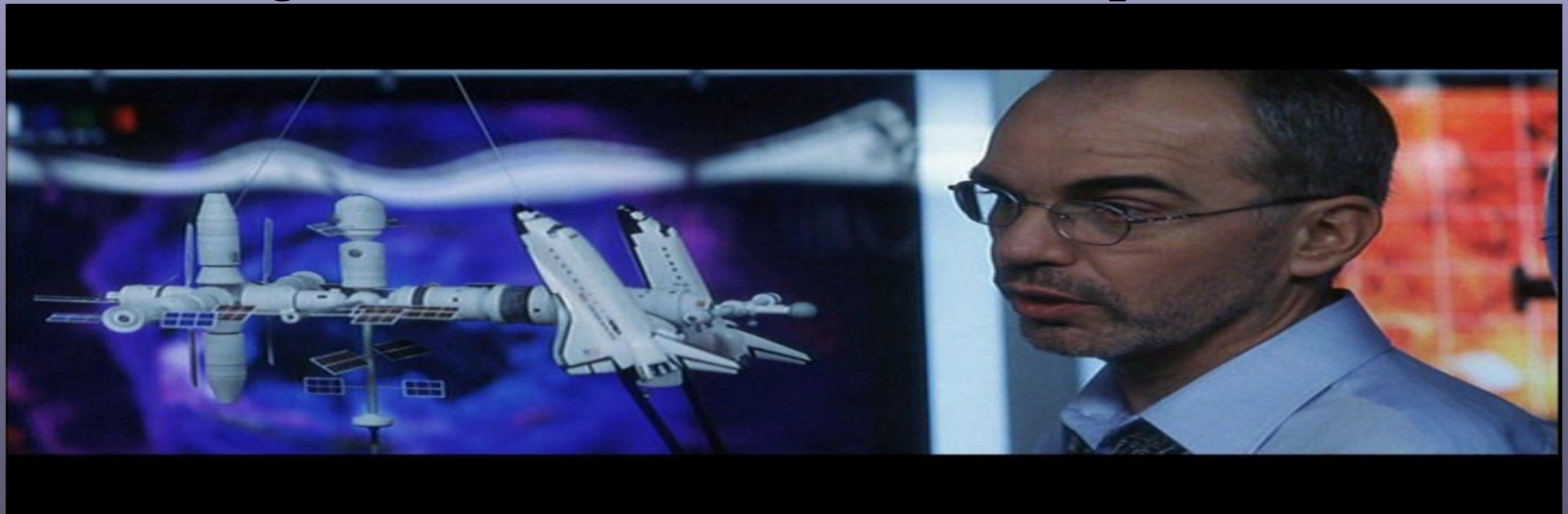
Deep Impact (cont)

- Explanation of the science in the movie was spot on in majority of cases
- Could have been a bit more detailed regarding certain facts (Orion project)
- Overall satisfactory

Armageddon

Some facts as stated in the movie:

- The asteroid is 1,289km (size of Texas) long (largest asteroid known is 2001 KX76 at 1400km).
- Travelling at 22,000 mph, average speed of comet travelling towards the sun is 30,000 mph.



Science Review of Armageddon

- Time taken to dock with Mir 67 min, average time to get to Mir is 60 min, however average time to dock is 1 day.
- Time taken to get to the moon 60 hours, time taken for Apollo 11 was 76 hrs
- Slingshot around the moon at $9\frac{1}{2}$ – 12 g's for 11 min, average blackout limit $8\frac{1}{2}$ g's for 40 secs.
- Drill to 800 feet (243.84 meters) which is about 0.02 % of total length.

Armageddon Conclusion

- The science is quite good up to a point.
- However after a while the directors (writers and producers) seem to give up.
- The plot needs a heroic sacrifice to save all mankind!



Very inaccurate science

- “The Core” is an example of a great deal of inaccuracy in movies
- No attention has been paid to whether any of the facts are true or not



The Core (cont)

- There are so many scenes where bad science is illustrated in this movie that it is actually hard to pick one.
- The melting of the Golden Gate bridge was a very good example of that.



Discussion

- Science is used widely in films for different effects
- Makes them more interesting, dramatic and intellectual
- Easier for the viewers to believe what is said to them in the movie if a scientific explanation is involved (even if it's wrong)

Discussion (cont)

- After analysing the ten movies, three general patterns seemed to evolve
 1. The science in the film is mostly correct
 2. The science is partly correct and there are mistakes, mostly plot driven
 3. Every scientific explanation is total rubbish

Discussion (Correct Science)

- Filmmakers have gone to great lengths to make sure science is accurate.
- Details are very well taken care of.
- Very few plot driven mistakes here and there but they seem unavoidable in order to stay faithful to the plot of the movie.

Discussion

(Not so correct science)

- These we like to call middle of the range movies.
- Attempts have been made to keep the scientific facts as close to accurate as possible but there have been a few slip-ups along the way.
- Not bad, could have been better.

Discussion

(Totally incorrect science)

- Not science fiction but not very far from it.
- No attention has been paid to the accuracy of the scientific explanation given in the movies.
- Some scenes are even ridiculous to anyone with a modest amount of scientific knowledge.

Conclusion

- Film is a great medium for conveying concepts and ideas.
- Therefore it has the potential to convey many different scientific concepts and ideas.
- However the main use of a film is for entertainment (telling a story), which means that correct science is often left at the wayside.
- The continuation of this project would mean review of many more films and questioning of film writers, producers and directors.