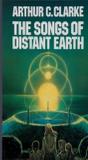


# Cosmic Catastrophes

## What science fiction can tell us about popular perception of astronomical disasters

Fictions involving catastrophic cosmic explosions such as novae or supernovae range from narratives of a heroic, constructive drive outwards into the Universe to depressing and destructive apocalyptic fictions which posit the destruction of human culture and perhaps humanity itself. SF case studies nonetheless represent a rare engagement of popular culture with the details of stellar astrophysics, and a useful starting point from which to engage in a wider discussion about the ultimate fate of stars and our place in the Universe.



**The Songs of Distant Earth** (Clarke, 1986) contrasts the experiences of early colonists with those of newly-arrived passengers on the Magellan, a faster-than-light spaceship which carries the last humans escaping Earth's solar system as the Sun "goes nova".

"With his own eyes, he had seen the volcanoes of Mars erupt for the first time in a billion years; Venus briefly naked as her atmosphere was blasted into space, before she herself was consumed; the gas giants exploding into incandescent fireballs. But these were empty, meaningless spectacles compared with the tragedy of Earth."

✦ Reflects common confusion between supernovae and novae in SF

✦ The Sun will neither go supernova (too small) nor nova (as it's not in a white dwarf binary)

✦ Contemporary SF of Solar novae was inspired in part by the solar neutrino problem which suggested the Sun may be dying or its interior nuclear physics misunderstood. This is explicitly discussed by Clarke in this book.

**Artificial Supernovae** are used as a dramatic plot device and for visual impact, particularly in television and film drama. This engages with narratives of unethical scientific experimentation or exploitation. It also provides opportunities for - often *inaccurate but authoritative-sounding* - scientific explanations.



✦ Starkiller Base (Star Wars: The Force Awakens)



✦ Stargate SG-1 "Exodus"

Inevitably alien technology is called upon - and low mass stars which wouldn't naturally explode... do.



✦ The Hand of Omega (Doctor Who) "Remembrance of the Daleks"

The prospect of the Sun ending its life in either a supernova or nova is nil. However this does not preclude the possibility of massive flares or outbursts later in its evolution.

✦ Larry Niven explored this in his short story "**Inconstant Moon**" (1973) which describes the torrid and hectic atmosphere of a California night, whose overly-bright Moon hints at catastrophe irradiating the other side of the planet and imminent doom.



✦ Recent works by Cixin Liu, such as his novella "**The Wandering Earth**" (2000), have also focussed on the (valid) astronomical prospect that the Sun will go through a brief brightening known as a "helium flash". This would be extremely short-lived in astrophysical terms, but would irradiate the Earth's surface. The Sun is likely about 5 billion years away from undergoing a helium flash, rather than the few centuries suggested by Liu, but it will at least experience this evolutionary state!

✦ "The End of the World" also featured in a 2005 episode of TV series **Doctor Who**. Here the Sun's expansion into the red giant phase has been artificially resisted. The constraints are relaxed, and the Sun engulfs the Earth. The story focusses on challenging the limited worldview of the Doctor's companion and her culture shock of facing astronomical scales in both events and time (these events are set, correctly, 5 billion years in the future).



The idea that the Universe is *mutable* and a *potential threat*, on a scale which far exceeds any human intervention, provides a **critique and commentary** on the impotence and arrogance of humanity. Invoking supernova-like catastrophes allowed authors either to point out the hubris of the mid-20th century assumption that any scientific problem was solvable, given enough effort and money, or to demonstrate it through vast efforts such as interstellar colonisation.

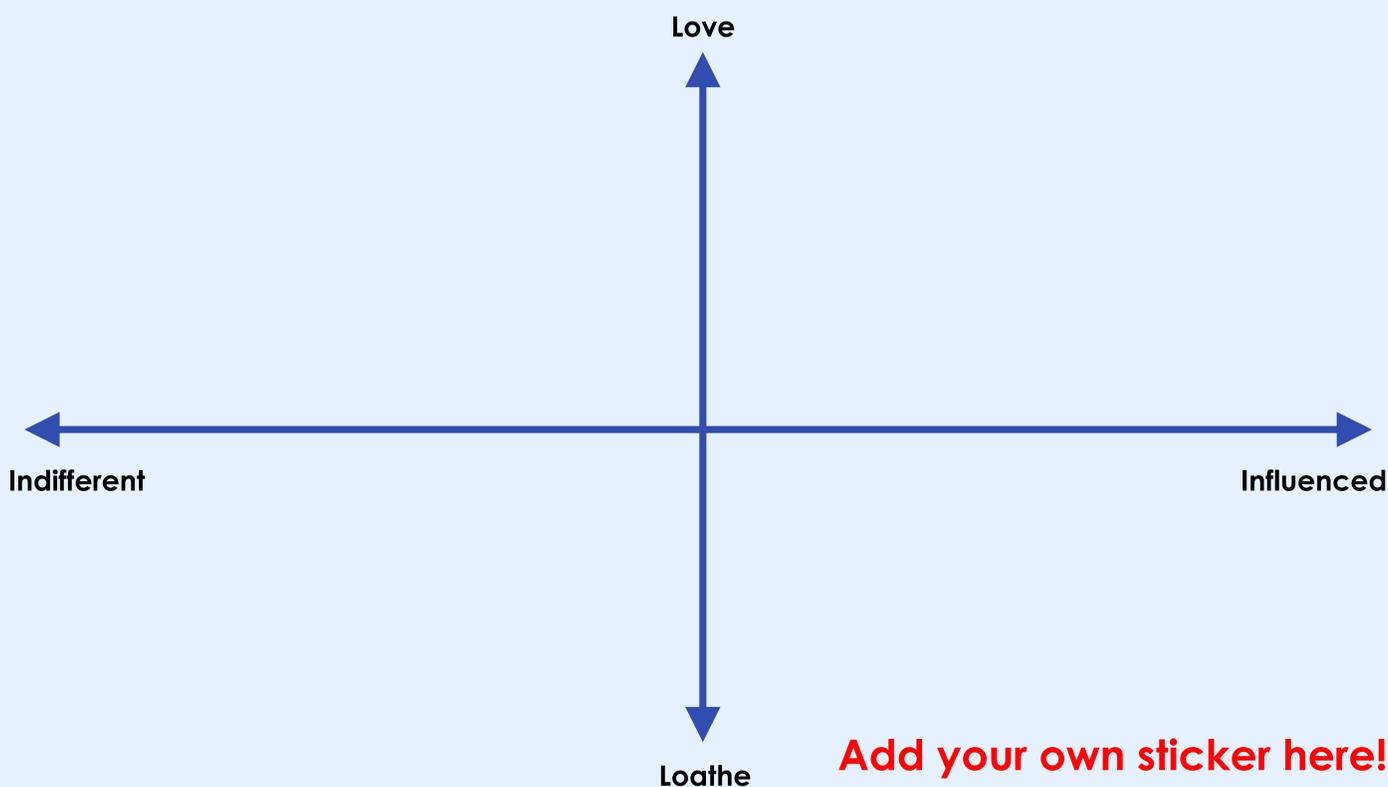
Astronomical catastrophism often plays with scenarios that position **scientists** themselves as key characters - predicting, observing or occasionally even causing the explosions. The difference in training and experience between the astronomer characters and the majority of readers gives the characters an air of being **other** and therefore an object of fascination (or perhaps renders them alien and repellent, as the plot requires).

The unfamiliarity of supernovae and novae to most of the population, together with their real-world positioning on the cutting edge of research, lends speculative fiction an air of **authority** and **mystery**. This is particularly true for readers or viewers with a limited astronomical background, and it is often astronomers that are shown articulating those mysteries. Often their explanations are rooted in contemporary physics understandings (as in Clark and Liu's work). But just as often it isn't (as in Star Wars and Doctor Who).

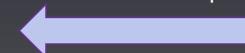
**Given the huge scale of supernova-type explosions, such fictions perhaps comment most clearly on the impotence of scientists who can study a problem, maybe even predict it... but never prevent it.**

### NAM 2022 Survey

- Do you **love** science fiction or **loathe** it?
- Do you feel it's **influenced** your career or life choices?



Please take a sticker and consider these questions



**Cosmic Stories**

Cosmic Stories is a regular, fortnightly blog which discusses the connections between science and science fiction, and the way they have influenced one another over time.  
Written by Dr Elizabeth Stanway (Reader in astrophysics at the University of Warwick, but views entirely my own!)  
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