

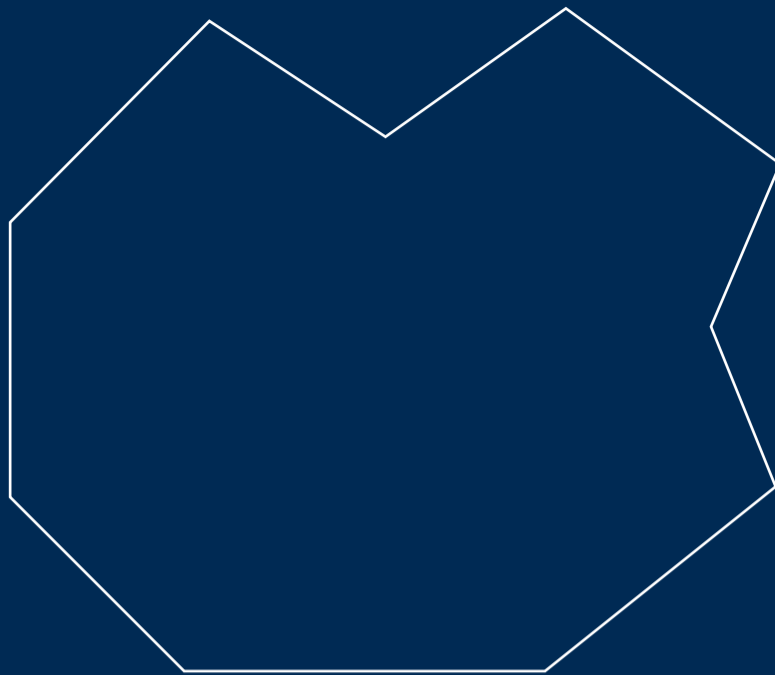
A BLACK HOLE IS A REGION OF SPACE IN WHICH THE GRAVITATIONAL FIELD IS SO POWERFUL THAT NOTHING, INCLUDING LIGHT, CAN ESCAPE ITS PULL. THE BLACK HOLE'S MASS CAN BE THOUGHT OF AS CONCENTRATED AT A **SINGULARITY**. SURROUNDING THE SINGULARITY IS A SPHERICAL BOUNDARY CALLED THE **EVENT HORIZON**. THE EVENT HORIZON MARKS THE 'POINT OF NO RETURN,' A BOUNDARY THAT, IF CROSSED, INEVITABLY LEADS FALLING MATTER AND RADIATION INWARDS, TOWARDS THE SINGULARITY.

IF YOU WERE TO VENTURE BEYOND THE EVENT HORIZON, TIDAL FORCES MILLIONS OF TIMES STRONGER THAN THOSE FOUND ON EARTH WOULD STRETCH YOU, AS THE PULL OF GRAVITY ON YOUR FEET INCREASED AT A HIGHER RATE THAN THE PULL OF GRAVITY ON YOUR HEAD. THIS SPAGHETTIFICATION WOULD BE UNPLEASANT.



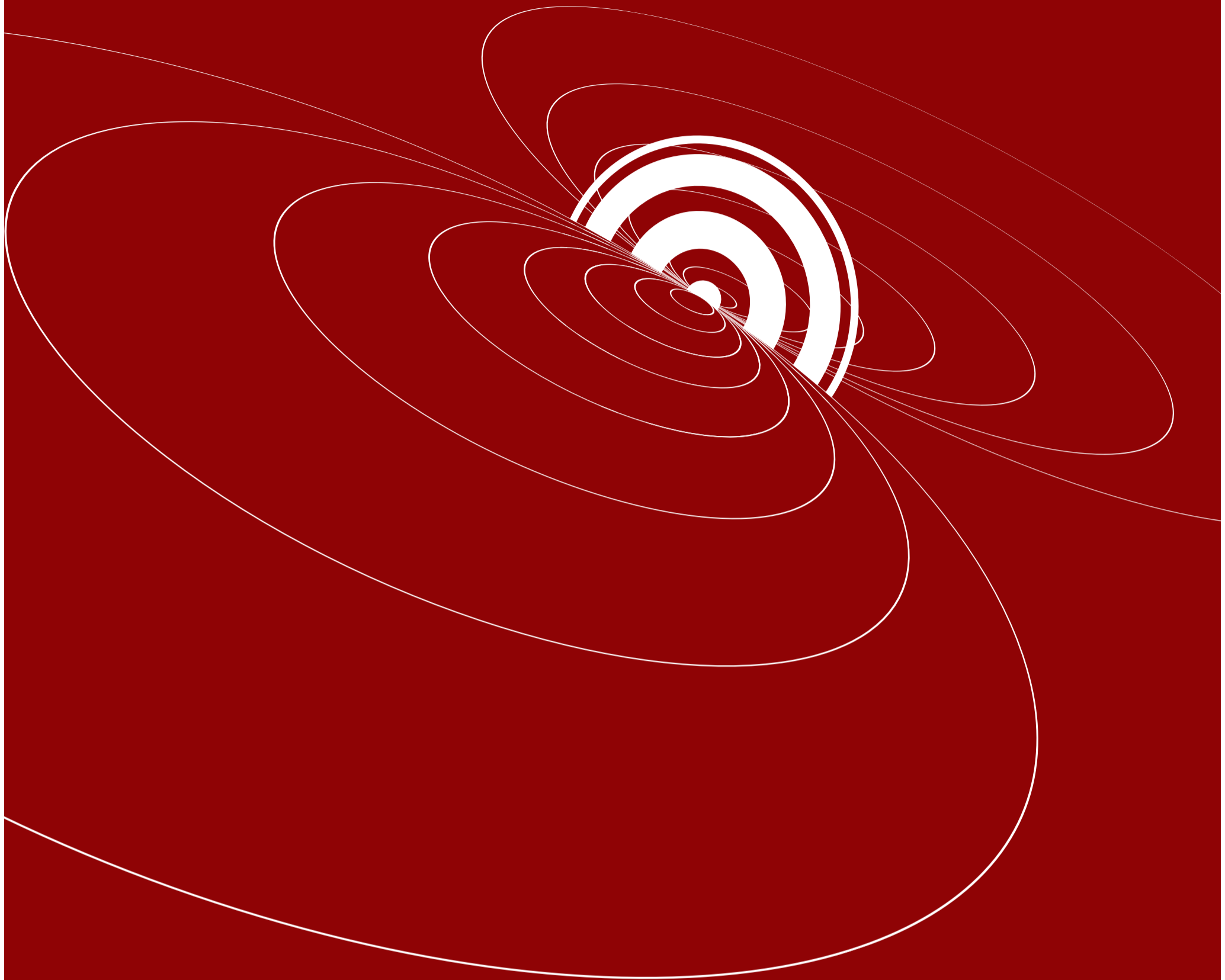
GAMMA-RAY BURSTS ARE FLASHES OF **GAMMA RAYS** FROM COLLAPSING LARGE-MASS STARS IN DISTANT GALAXIES. THEY ARE THE MOST LUMINOUS **ELECTROMAGNETIC** EVENTS IN THE UNIVERSE SINCE THE BIG BANG. THEIR DURATION IS TYPICALLY A FEW SECONDS, BUT CAN RANGE FROM A FEW MILLISECONDS TO SEVERAL MINUTES. IN THIS SHORT TIME SPAN THEY RELEASE MORE ENERGY THAN OUR SUN WILL RELEASE IN ITS ENTIRE LIFETIME.

IF A NEAR-EARTH BURST WERE POINTED AT US, IT COULD SIGNIFICANTLY AFFECT THE EARTH AND SEVERELY DAMAGE THE BIOSPHERE. THE GAMMA-RAY RADIATION WOULD FAR EXCEED THE MOST INTENSE SOLAR FLARES. THE ABSORPTION OF RADIATION IN THE ATMOSPHERE WOULD CAUSE PHOTODISSOCIATION OF NITROGEN, GENERATING NITRIC OXIDE THAT WOULD ACT AS A CATALYST TO DESTROY OZONE. WE WOULD LIKELY FRY.



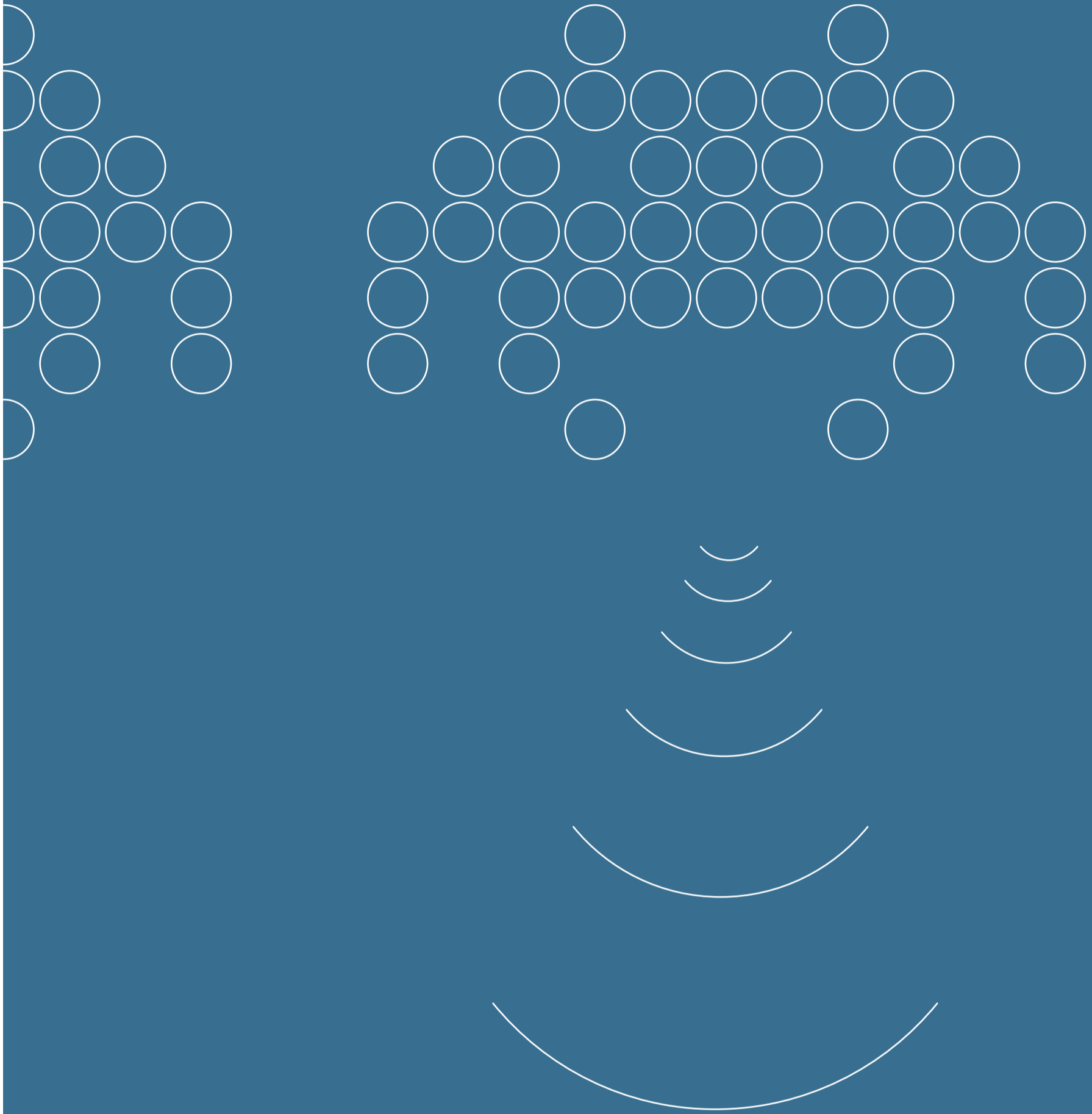
A PLANETARY MASS **EXTINCTION** CAUSED BY AN **IMPACT EVENT** HAPPENS ONCE EVERY 300 MILLION YEARS.

IMPACT OF AN ASTEROID LARGER THAN 35 METERS WOULD IMMEDIATELY DESTROY ANYTHING WITHIN A FEW HUNDRED MILES. MOLTEN DEBRIS WOULD RAIN DOWN HALF A CONTINENT AWAY. SMOKE AND ASH WOULD BLOCK OUT THE SUN ACROSS THE GLOBE. THINGS GO DOWNHILL FROM THERE. JUST ASK THE DINOSAURS. THEY DIDN'T HAVE BRUCE WILLIS TO SAVE THEM.



A SUPERNOVA IS A **STELLAR EXPLOSION**. SUPERNOVAE ARE EXTREMELY LUMINOUS AND CAUSE A BURST OF RADIATION THAT OFTEN BRIEFLY OUTSHINES AN ENTIRE GALAXY OVER SEVERAL WEEKS OR MONTHS. DURING THIS INTERVAL, A SUPERNOVA CAN **RADIATE** AS MUCH ENERGY AS THE SUN OVER ITS ENTIRE LIFESPAN. THE EXPLOSION EXPELS MUCH OR ALL OF A STAR'S MATERIAL AT UP TO A 1/10 THE SPEED OF LIGHT, DRIVING A SHOCK WAVE INTO THE SURROUNDING INTERSTELLAR MEDIUM.

A NEAR-EARTH SUPERNOVA, OCCURRING FEWER THAN 100 LIGHT-YEARS FROM EARTH, CAN HAVE NOTICEABLE EFFECTS ON OUR BIOSPHERE. THIS HAS BEEN PROPOSED AS THE CAUSE OF THE **END ORDOVICIAN EXTINCTION**, WHICH RESULTED IN THE DEATH OF NEARLY 60% OF THE OCEANIC LIFE ON EARTH 450 MILLION YEARS AGO. THE WHALES, SADLY, WERE NOT SAVED.



WE HAVE NO WAY OF KNOWING IF THERE ARE OTHER LIFE FORMS IN THE UNIVERSE, WHAT THEY MIGHT POSSIBLY LOOK LIKE IF THEY DO EXIST, OR WHAT KIND OF INTELLIGENCE THEY MIGHT POSSESS. SCIENTISTS ARE TRYING TO FIND SIGNS OF ALIEN LIFE VIA [RADIO WAVES](#), [DIRECT SATELLITE OBSERVATION](#), AND THE SEARCH FOR [EARTH-LIKE EXTRASOLAR PLANETS](#).

IF SUCCESSFUL, WILL BE WELCOMED INTO A NEW ERA OF GALACTIC PEACE AND TECHNOLOGIC MARVELS? WILL THERE BE GALACTIC WAR WITH OUR AGGRESSIVE ALIEN NEIGHBORS? OR WILL SOME SIMPLE ALIEN BACTERIA CAUSE THE END OF HUMANITY? YOU SHOULD PROBABLY START CARRYING A PACK OF REESE'S PIECES IN YOUR POCKET, JUST IN CASE.