



NANCY GRACE  
**R.OMAN**



SPACE TELESCOPE

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00:00:00,001 --> 00:00:04,334

Celestial Sunday Presents: Michelle Thaller explains cosmic dawn.

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00:00:04,480 --> 00:00:09,120

Hi i'm Michelle Thaller from NASA's Goddard space\h  
flight center and I'm an astronomer and one of\h\h

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00:00:09,120 --> 00:00:13,440

the terms that you'll be hearing a lot when we\h  
talk about the James Webb Space Telescope and also\h\h

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00:00:13,440 --> 00:00:19,200

the upcoming Nancy Grace Roman Space Telescope,\h  
is the term cosmic dawn and that sounds really\h\h

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00:00:19,200 --> 00:00:24,480

dramatic and lovely. So the cosmic dawn is in\h  
fact the end of the cosmic dark ages it's a time\h\h

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00:00:24,480 --> 00:00:31,280

when the universe changed. It used to be very\h  
long ago that the universe expanded and cooled\h\h

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00:00:31,280 --> 00:00:36,400

and when it did it formed what we think of as\h  
normal atoms, atoms that have nucleus and electrons\h\h

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00:00:36,400 --> 00:00:42,560

going around them and the thing about an atom is\h  
that it can actually absorb light really well, when\h\h

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00:00:42,560 --> 00:00:47,840

you shine light on an atom, electrons can absorb\h  
the light and jump around to different orbits\h\h

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00:00:47,840 --> 00:00:53,680

in the atom and basically the light goes away the\h  
light was absorbed. And so there was a time I would\h\h

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00:00:53,680 --> 00:00:59,600

say you know maybe about 200 million\h  
years, 300 million years after the big bang when\h\h

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00:00:59,600 --> 00:01:04,880

the gas between the stars and galaxies was very\h  
good absorbing light, it had atoms with electrons\h\h

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00:01:04,880 --> 00:01:09,920

and everything just got absorbed. Then something\h  
really mysterious happened that actually broke\h\h

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00:01:09,920 --> 00:01:15,520

all of the atoms apart in the gas between the\h  
stars and galaxies and we think it may have had\h\h

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00:01:15,520 --> 00:01:21,520

to do with the formation of the first giant black\h  
holes. Black holes often have huge high-energy jets\h\h

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00:01:21,520 --> 00:01:25,440

that come out of them these jets can extend for\h  
hundreds of thousands of light years and basically\h\h

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00:01:25,440 --> 00:01:31,120

rip apart any atom in their path so what happened\h  
then is that all the atoms got ripped apart\h\h

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00:01:31,120 --> 00:01:35,520

light could actually go through the universe and\h  
for the first time we were really able to see\h\h

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00:01:35,520 --> 00:01:40,720

distant stars and galaxies but, if we look\h  
so far back in time and so far away there\h\h

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00:01:40,720 --> 00:01:44,720

becomes a point where the universe is very good\h  
absorbing light it's very hard to see any further.\h\h

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00:01:45,280 --> 00:01:50,160

so Webb and Roman will be right up against that  
limit seeing if we can peer a little bit into that

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00:01:50,160 --> 00:01:54,720

barrier and see what was going on when the  
universe was still cool enough to absorb light

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00:01:54,720 --> 00:01:58,960

the era of the very first stars and galaxies,  
So I hope you understand a little bit more