**Ahrns uses photos to convey ‘digestible weird science’**

By Meghan Murphy

A flash of red lightning. A pulsating aurora. These fleeting phenomena are hard to see with the naked eye, let alone capture with a camera. Yet University of Alaska Fairbanks doctoral student Jason Ahrns captures these images for research and art.

The space physicist is researching what causes a rare kind of aurora. He saw it through a highly sensitive camera that he helps operate at Poker Flat Research Range. Called Allsky, the camera captures a fisheye view of the night sky and feeds real-time images of the aurora to the web.

Anyone can watch the footage, but Ahrns noticed what most would not — a common type of aurora demonstrating unusual behavior. It almost always looks like a blob of barely there green, and yet large, beautiful waves were swelling on its southern edge.

Ahrns asked his advisor Don Hampton for his opinion, but the researcher at the Geophysical Institute and Poker Flat Research Range was puzzled.

“He said he had never seen it before, so I started reading up on it and realized we had something pretty unique,” said Ahrns of the pulsating aurora.

“It’s considered to be a proton Aurora phenomenon, meaning they show up when protons are streaming down the magnetic field lines rather than the usual electrons,” he said. “I think I can show that, at least in some cases, it's electrons after all that's causing them.”

He said understanding how and which particles are driving the different types of auroras can help scientists better predict space weather events.

Ahrns uses Allsky and other optical instruments at Poker Flat Research Range to study the pulsating aurora. He also uses the personal optics in his life — his Nikon and Sony cameras — to capture the beauty of the aurora and other visually striking phenomena.

In fact, his photos of sprites or red lightning have gone viral. Yes, it’s as as cool as it sounds — music bands have claimed both names.

When lightning discharges beneath a cloud, it creates a strong electric field above the clouds. This energizes some of the air molecules and causes them to glow in red flashes.

Ahrns captured the photos while helping researchers photograph sprites with $100,000 worth of sensitive scientific equipment aboard an airplane. Since sprites only last a few milliseconds, the expensive Phantom cameras took black and white photos at 10,000 frames per second.

On a whim, Ahrns set up his Nikon D7000 with a $120 35mm f/1.8 lens. Several flights and several thousand clicks later, he got the picture he never expected he would get — red, glowing streaks braced against a dark sky.

He loaded it to Flickr and submitted it spaceweather.com, where it garnered a worldwide audience.

“The photo was a good combination of a visually stunning phenomenon that most people had never even heard of before,” he said. “And almost everyone likes to see some kind of easily digestible weird science.”

It’s obvious that that Ahrn’s passions for space physics and photography complement each other, but which came first?

“I had a general interest in the night sky,” he said. “So I learned to shoot it, and I learned more about it.”

**More info for photography buffs**

*Ahrns is as passionate about photography as he is about space physics. He answered a few questions about the techniques and gear he uses to capture stunning night images.*

**What gear do you think is essential for a night photographer?**

A sturdy tripod is a huge help. I see a lot of people trying to use cheap tripods with plastic legs, but a solid tripod is a good investment. A lot of people think you need to use a remote release for night photography to prevent the camera from shaking when you hit the shutter button, when the real problem is their tripod isn't strong enough for their gear and that's why the camera shakes. I never use a remote release unless I need an advanced intervalometer or I'm doing actual long-focal length astrophotography.

**Do you have a favorite camera make and model of camera?**

If I could only have one camera, it would be a Nikon D810. If I could have a second one, it'd be the Sony a7S II.

**Do you prefer Nikon over Canon and, if so, why?**

I used a Canon 5D Mark III a few years ago for an Aurora planetarium project. It was a great camera, but I prefer the ergonomics and control layout of the Nikons. This probably has more to do with me learning on and being very familiar with the Nikons than it does with any objective reason for one being “better” than the other.

**How does Sony's mirrorless camera compare to DSLR in terms of night photography performance?**

The Sony a7S is unquestionably better once you turn the ISO above about 3200. It's somewhat unimpressive below there, and I don't find it a great general-purpose camera. I don't like the ergonomics or menu layout. It seems “sluggish” compared to the responsiveness of my Nikons. It has terrible battery life due to the need to constantly read the sensor and light up a screen. The smaller body doesn't seem to sit or balance as well in my hands. Plus, I highly prefer looking through an optical viewfinder to an electronic one.

**Any tips for beginning night photographers?**

A lot of beginners seem to get hung up on “the right settings” when they first try night photography. They would have an easier time if they just forgot the idea of “the right settings” and instead just started experimenting. Digital cameras make this easy because they give you instant feedback. You can quickly find a good combination of manual settings in any situation by just picking some settings to try out, looking at the preview image, and adjusting from there. There is no one single “correct” combination of settings.

**Did you start out photography with a professional grade or work your way up in terms of cameras?**

I started with a little Kodak point-and-shoot that cost about $100. My first DSLR was a Nikon D5000. I've used a lot of different things since then, even getting into doing quite a bit of film using halfway-refurbished old eBay finds.

**Do you use new or used equipment?**

I'm kind of in love with using old manual-focus lenses right now. You can get really nice lenses for a steal because people nowadays are afraid of manual focus! Three of my four “standard” lenses are at least 20 years old. And I have five or six old film cameras in various degrees of functionality that I use regularly. You can have a lot of fun with used gear for not a lot of money, and, if that stuff could take world-class images 20 years ago, it can still do so today.

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*Cutlines:*

*Ahrns\_nebula.jpg*

*Jason Ahrns photo*

*Jason Ahrns took this photo of the Horsehead and Flame nebulas with his D7000 on a special mount that counteracts the rotation of the Earth, so the camera spins exactly opposite the way the Earth is spinning, allowing long exposures of the stars without getting star trails.*

*Ahrns\_mug.jpg*

*Jason Ahrns photo
University of Alaska Fairbanks doctoral student Jason Ahrns uses photography to capture the aurora and other images from space.*

*Ahrns\_aurora.jpg*

*Jason Ahrns photo
Jason Ahrns photographed an "exploding" aurora by aiming his camera up through the magnetic field line. "They call it a 'corona' aurora when you see it," he said. "Where you look to see parallel to the field line just depends where on Earth you are. For Fairbanks, it's about 80 degrees above the southern horizon."*

*Ahrns\_sprites.jpg*

*Jason Ahrns photo
Ahrns captured this photo of sprites or red lightning with his D7000 Nikon aboard the same flight where there was $100,000 worth of expensive camera equipment that could shoot 10,000 frames per second.*