

## Audience Scanning in the USA: Where is It?

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October, 2000: In two short weeks after I finish writing this story, I'll be in Stuttgart, Germany, enjoying what may be the peak experience when it comes to laser light shows. Even though it's one of the most awe inspiring, eye-boggling effects you can do with lasers, it's an effect you won't see in the US. That's not exactly true--you can see it if you slip into late-night, smoke-shrouded parties where the crowds aren't too concerned about venue management following health and safety regulations. But if you are at one of these parties and see this effect, you might suddenly find yourself taking an interest in federal safety rules covering laser light shows ...

The effect I'm talking about is called audience scanning. It happens when laser beams are directed into the crowd itself, immersing the audience in cones, tunnels and dancing shafts of iridescent laser light. Crowds love this effect, and it's no secret why. Looking at laser beams hop scotching over your head is pleasant enough, but when the beams reach out and actually *touch* you, it's good-bye planet earth and hello next dimension. I saw my first legally produced audience scanning show (we're not counting late-night sessions in a private laser studio, where you dial-up the laser and stand inside a hastily erected field of beams) two years ago in Amsterdam. Like most Americans attending the event, I was in wide-eyed wonder. Of course, this was the annual awards banquet for the International Laser Display Association (ILDA), so the shows were among the best in the world. But for many of us poor Americans, deprived all our lives of such tactile photon fixes, audience scanning was suddenly the Holy Grail of Laserdom.

I'll be at ILDA's award banquet in Stuttgart a short time from now, once again itching to get my eyeballs in the middle of rapidly oscillating laser beams. But why can't Americans see audience scanning in the USA? The short answer is safety. Laser light is brighter than the sun, and direct exposure to a powerful laser beam is an eye hazard.

Many lighting professionals assume that laser safety standards in the US are tougher than in Europe. That's not true: standards for laser light are nearly identical throughout the world. The key piece of the puzzle is called the Maximum Permissible Exposure (MPE) level, which roughly translates into how much laser light the human eye can handle before damage might occur. Countries that have safety standards covering laser light (and most Western nations do) all use the same MPE levels.

Audience scanning in the US is legal as long as you stay within the MPE, have equipment safeguards to protect against any malfunctions, and have a show "variance" approved by the government regulators. Which brings us to another myth about audience scanning in the US: hard-nosed safety regulators would find a way to shut down an audience-scanning show, no matter what safety steps were taken. Although US regulators

are perhaps more active than their European counterparts when it comes to scrutinizing laser light shows, they have approved audience scanning in the past.

It happened back in the late 1970s, during the height of the discotheque wars in New York City. The club was called Xenon, and its owners wanted the most exciting lighting effects possible. Dick Sandhaus, president of Science Faction in New York, answered the call. He designed an audience scanning system and got it approved by the Food and Drug Administration, which had recently begun to regulate laser light shows. Using a full-color laser, Sandhaus covered the crowd with broad, angular sweeps of laser light. "People loved it," recalls Sandhaus. "It worked especially well during a hard blackout. People would yell and scream for it from the dance floor."

Like the disco beat itself, however, audience scanning was soon to vanish from the dance floor. "We chose to stop because other people were doing it (audience scanning) in unsafe ways," said Sandhaus. The outlaw laser operators, who bypassed government regulations and performed any type of show they wanted, spoiled the market for legitimate companies, he said. There was, for example, the notorious heavy-metal rock group that routinely exposed audiences to a high-powered beams of laser light without taking any semblance of safety measures. That forced federal regulators to step up enforcement efforts, and in turn made reputable companies worry that they might be caught in a safety backlash against audience scanning.

Since those glorious days of disco, audience scanning has been all but absent from legitimate US venues. "Early on, people who weren't knowledgeable about gave the safety community reasons for saying that audience scanning should not be done," said Greg Makhov, president of Lighting Systems Design, Inc., of Orlando, Fla., and one the leading experts on laser safety in the US. "While audience scanning can be done safely, it's a delicate balance between safety and the effect. If the effect wasn't so good, it wouldn't be worth the risk."

This concern, for safety, by the way, occurred despite there being virtually no record of any audience member filing a complaint about laser light shows—whether the shows were legitimate or outlaw. Despite a clean safety record that persists to the present day, regulators around the world will still crack down on laser shows if they feel the all-important MPE level is being exceeded. It's recently happened in the UK, where audiences scanning shows were completely stopped for a long period. In the rest of Europe, a host of established companies continue to perform audience scanning shows with a professional attitude toward safety.

The MPE level itself, however, is once source of trouble. While few dispute the biomedical evidence supporting the MPE, even knowledgeable people will disagree on how to compute the level for a particular laser show. Some will take a conservative approach to crunching the numbers, while others will do the math differently and come up with higher permissible light levels. The range of interpretation is possible because measuring the safety of an effect is rarely as easy as putting up a meter and reading a number. Because shows usually contain numerous audiences scanning effects, the safety

of each effect must be determined and then the cumulative impact of the entire show needs to be evaluated. For a complex show, it can be a time-consuming process.

For audience members, it's even worse. Relying on your eye alone to judge the safety of a show is far from foolproof, said Makhov. Bright green and white colors, for instance, can make you blink and avert your eyes even when the MPE is not exceeded. On the other hand, deep reds and blues can easily exceed the MPE yet not cause an aversive reaction.

If you find yourself in a show that features audience scanning, is there anything you can do to determine a show is safe? The best measure is to know the company that's producing the show. Any legitimate company doing audience scanning will be able to point to their equipment safeguards and safety measurements.

If you find yourself at a rave or other situation with an outlaw laser company, you can still check the basics. First and foremost, ask the laser operator what kind of laser is being used. If it's a pulsed laser, then stay away from the show entirely. These units fire individual "bursts" of laser light that generate a shock wave in human tissue. Even though the power level of a continuous wave laser and a pulsed unit might be identical, the concentrated pulse of light is far more dangerous than light delivered in a continuous wave. Unfortunately, there have been a frightening number of reports of audience scanning shows using pulsed lasers both in the US and Europe.

The next step to increase your safety is to put distance between you and the source of the beams. Laser beams expand as they travel through the air, reducing the safety risk by spreading the beam's energy over a larger area. If the show feels too hot, move to the back of the room. Finally, make sure the beam is moving all the time, and moving very rapidly. How fast is fast enough? A beam that stays in one spot for just a few milliseconds can be a hazard, and this can often occur when the beam pauses for a moment at the end of scanned line segments. But unless you have the right tools, it's practically impossible to measure this.

The best rule of thumb, obviously, is to make sure that whoever's doing audience scanning has taken measurements of the show, done the safety calculations, and installed the proper equipment safeguards to protect against a mechanical breakdown.

I hope a company in the US will take up the audience scanning challenge and open the eyes of Americans to this dazzling effect. Until then, it's off to foreign shores.

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