Wobulation: HP innovation lights the way for better HDTV resolution

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When a Fortune 50 company calls one of its technologies “wobulation” you know something big is afoot. Something driven by a high level of enthusiasm and pride.

And that’s just what wobulation is. A ground-breaking new technology that’s creating a buzz among High Definition TV (HDTV) enthusiasts. Like all HP innovations, it’s not just “cool.” It’s relevant and practical – something that makes life better, every day.

Picture with wobulation (above) and picture without wobulation (below)

Wobulation is part of HP Visual Fidelity, the power behind the picture displayed on our new HP Pavilion High Definition digital light projection (DLP™) TVs. Harnessing several technologies that work in concert, HP Visual Fidelity produces a smoother high-definition picture with lush, vibrant colors, fine detail, and a level of clarity you'd be hard put to find anywhere else.

With ordinary HDTVs, achieving high resolution is an expensive process. The part of the TV that generates the pixels – the spatial light modulator (SLM) – is one of the priciest parts of a projection system. But TVs with wobulation technology are able to double the number of pixels in the image without doubling the pixel on the modulator, so there's no need for a more expensive SLM – and no need to spend nearly twice as much for the same high-quality picture.

How is it possible to double the resolution with the same number of pixels? By thinking about light the same way you think about ink. HP research had already shown it was possible to create higher resolution prints by carefully overlapping drops of ink on paper.

By applying the same thinking to projection, wobulation overlaps points of light. It actually projects two independent, overlapping images, so that one pixel is replaced by two – but it all happens so precisely and quickly that all the human eye notices is a smoother, more natural-looking image. Wobulation virtually eliminates the distracting "screen door" effect of a grid of pixels. In HP testing, viewers have actually preferred wobulated images over non-wobulated images created with a double pixel count spatial light modulator.

Wobulation is winning over the most knowledgeable critics. Sound and Vision magazine said of the wobulation-powered HP md6580n high

definition DLP TV: “Put simply, HP’s MD6580n produced the best DLP-based rear-projection TV image I’ve seen yet, and in many wa ys its picture compared favorably with that of the much more expensive Sony Qualia 006.”

Wobulation is just one of the features that make enjoying high definition easier than ever. In addition to designing Pavilion DLP TVs with the most advanced high-tech ingenuity, HP thought long and hard about how to simplify every interaction a user has with a TV.

For instance, think about the last time you had to plug a module, such as a game system console, into the back of your TV. Chances are, it was heavy to move, and it was hard to see where to plug in the cables. With HP Pavilion DLP TVs you don’t need flashlights and strong friends to plug in modules. Each set includes a hinged panel on the front that reveals all the inputs and outputs, as well as the lamp-replacement compartment. It’s even lighted and color-coded so you can quickly find what you need and get back to your movie or game. What could be more simple – you never have to squeeze behind or struggle to move your TV again.

Ink as the fuel for creative inspiration

The beauty of how wobulation was invented is that it embodies one of the main philosophies of innovation at HP: that breakthroughs in one area can fuel creative thinking in another.

Wobulation’s inventor is Will Allen, chief scientist in HP’s Display Technolgy and Products group. After focusing on ink-based technologies, Allen redirected his creative energy to digital image projection. Rather than thinking about ink, Allen thought about light.

“As I learned how digital projectors worked, I realized they had a

striking number of similarities with inkjet printers," explains Allen. "Both devices create a color picture from a matrix of points composed of primary colors. I discovered, to my surprise, that light was the 'ink' of our dreams. Being easier to control, light allowed us to accomplish in weeks what had ta ken years to accomplish with inks."

HP's research with inkjet printers showed that to increase print quality you need to place more and more overlapping ink droplets within the same size grid on a small area on the page. This yields better image quality, even if dot size is not reduced. Allen surmised that applying this concept to projection systems would improve resolution of projected images.

To test the idea, Allen and his team modified a projector and used an aerospace mirror to rapidly and accurately shift a projected image in a way that overlapped the pixels. Two specially constructed images were projected. When they first projected the test images on the wall everyone was stunned by crisp quality. Wobulation had been born.

Who would know more about image quality than HP, already the leader in inkjet printing? HP has spent over a decade testing how people react to image quality for printers, and has gathered and analyzed massive amounts data. All this research that has helped HP refine printers is now being used to raise the quality barriers for high-definition DLP TVs.

Innovation that changes how you work and live

With at least five wobulation-related patents soon to be or already granted and dozens more in process, wobulation is shaping up to be yet another ground-breaking technology born from the brilliant minds at HP. Wobulation follows in the footsteps of dozens of decades of pioneering, innovative, yet practical HP technologies. Harking back to the garage in Palo Alto, California where Bill Hewlett and Dave Packard launched HP

in 1939, HP has always focused on solving customer problems, spawning new markets, and simplifying technology so it can be woven into customers' lives.

Source: HP