



A Philips Lumalive light-emitting T-shirt that expresses our mood and gives messages to the people around us.

# Creating a magic lighting experience with textiles

Few activities in life are more rewarding than self-expression. From choosing the clothes we wear to the way we decorate our homes, each of us has an opportunity to create something intensely personal and very special. Textiles have always played an important part in this creativity, providing us with a rich tapestry of color, texture, shape and form. Thanks to on-going work at Philips Research, animated color illumination is a new creative dimension that textiles will now be able to deliver. Philips Research's new light-emitting 'Lumalive' fabrics will also have important applications in healthcare and personal safety.

By Peter Harold

Photography/illustrations: Philips, Capital Photos, James Prinz

It is a well-known fact that by controlling the intensity of red, green and blue light-emitting diodes (LEDs) placed in close proximity to one another, you can re-create just about any color imaginable. The principle is already widely exploited in the LED-based advertising screens that surround virtually every premiere football stadium.

By sealing conventional low-cost LEDs into a laminated plastic panel that is flexible and durable enough to withstand constant flexing, the Photonic Textiles group at Philips Research has succeeded in embedding arrays of these LEDs beneath the surface of textiles, making it possible for soft furniture and clothing to come alive with myriad patterns of colored light. Layers of translucent textiles cover the LED panel to diffuse the light so that the pixels flow smoothly into each other and also provide the required level of softness and surface texture. Integrated electronics drives the LEDs to create fixed or moving patterns of light that bring the magic of illumination to the textiles.

"Sounds simple in theory, but in practice it isn't," says team leader Bas Zeper. "In developing solutions for our Lumalive fabrics, we faced significant technological challenges in creating large-area

electronic systems that on the one hand are mechanically very flexible, yet on the other hand are also very robust. In addition, we have put a lot of effort into improving the modularity of the LED array, minimizing the number of interconnections and miniaturizing the control electronics."

But how do you turn an innovative and illuminating idea into a commercial success? "It's not enough to just explain to people in words and still pictures what they can do with our Lumalive fabrics", says Zeper. "Our technology allows for an impressive dynamic and colorful visual experience, and therefore we prefer to give practical demonstrations to potential partners and customers. Triggered by the magic lighting experience, they normally come up with large numbers of application ideas. And if they then really show commercial interest in the technology, we offer them sample kits for test purposes within their own field of use."

These experience exercises are now being performed by several leading furniture, sportswear and rucksack manufacturers as well as by some of Europe's best known interior designers. Furthermore, Zeper and his team are taking live demonstrations to leading →



For her latest fashion collection, award-winning designer Anke Loh uses Philips Lumalive light-emitting textiles to create an almost magical lighting experience. Photo by James Prinz and dress by Anke Loh

consumer electronics shows such as the IFA in Berlin (Germany). These demonstrations currently include a stylish over-jacket with a Lumalive panel built into the front or the back and a living-room sofa that emits colorful patterns of light along the length of its backrest. "The sofa is particularly impressive, because when they first see it most people look up to the ceiling to see where the projection beamer is," says Zeper. "Then they suddenly realize the light is actually coming out of the sofa itself."

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Bas Zeper, Photonic Textiles team leader

Having succeeded in capturing their interest, Zeper and his team then provide potential customers with a development kit so that they can get a feel for the technology and how it might fit into their products. Comprising a square panel containing an array of two hundred RGB pixels, plus all the necessary drive electronics, design manuals and a selection of suitable diffuser and overlay materials, this kit allows designers to experiment with a wide range of different lighting effects.

Lumalive fabrics may be set to revolutionize the clothes we wear and the way we furnish our homes, but consumer-oriented markets are not the only ones on Zeper's hit list. As the examples on the following pages illustrate, light-emitting textiles also have important potential applications in medicine, healthcare and personal safety. ➔

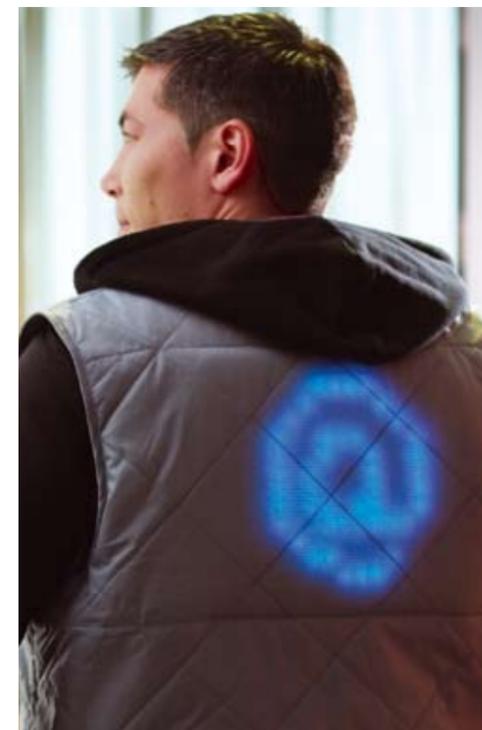


## Seeing is believing

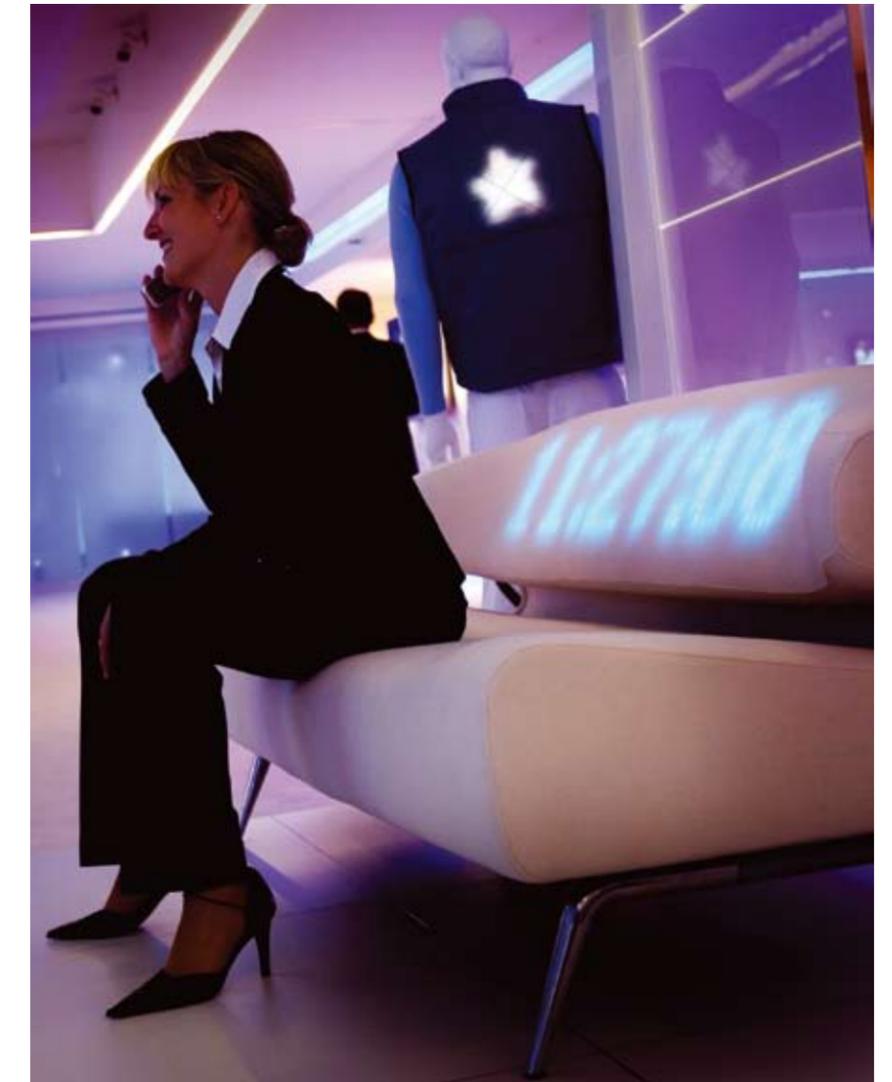
Among the Lumalive demonstrators produced by Philips Research are a stylish over-jacket with a light-emitting textile panel a living-room sofa with a light-emitting textile backrest, and a pillow that displays soothing color patterns.



Applied in soft fabric, the light from the small pixels diffuses, resulting in more or less continuous light-emitting soft surface..



On jackets containing the Philips Lumalive fabrics dynamic advertisements, graphics and constantly changing color surfaces can be displayed.



The Philips Lumalive couch is a perfect example of how Lumalive light-emitting fabrics can be used in the home, or professional environments like lobbies and offices.

.... applications

.... applications



.... in personal safety

When it comes to safety after dark, 'see and be seen' is the order of the day. Light-emitting Lumalive fabrics used in outdoor sportswear could make sure you see night-time joggers long before you catch them in the beams of your car headlights. Built into the protective clothing of first responders, such as police, fire and ambulance crews, they will insure instant visibility from the moment responders arrive on scene.

.... in fashion

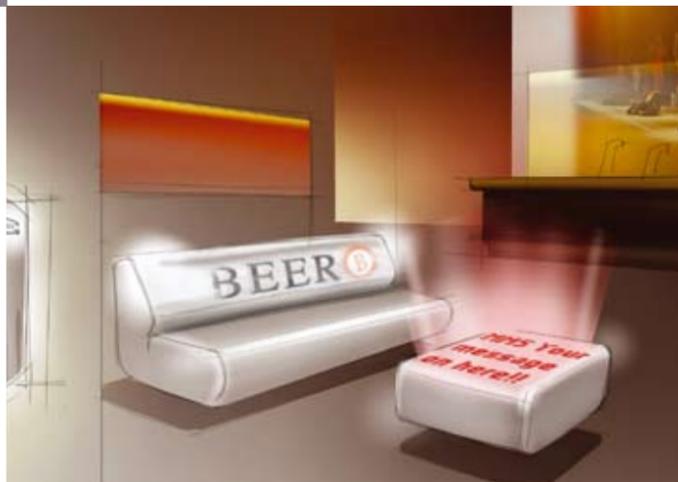
Tomorrow's supermodels could be strutting the catwalks in clothes that dazzle the audience like never before, with colors and patterns changing instantly to suit different moods. And because you'll be able to program your own colors and patterns onto your clothes, the scope for personal expression will be virtually limitless.



Photo by James Prinz and dresses by Anke Loh

.... in signage and advertising

With Lumalive fabrics, virtually any soft-furnishing or fabric surface can be used to display information or logos. Place your glass of beer on the table in front of you and sensors in the table could automatically detect the brand and communicate it to the chair you are sitting on. Hey presto, your chair reflects your taste in beer.



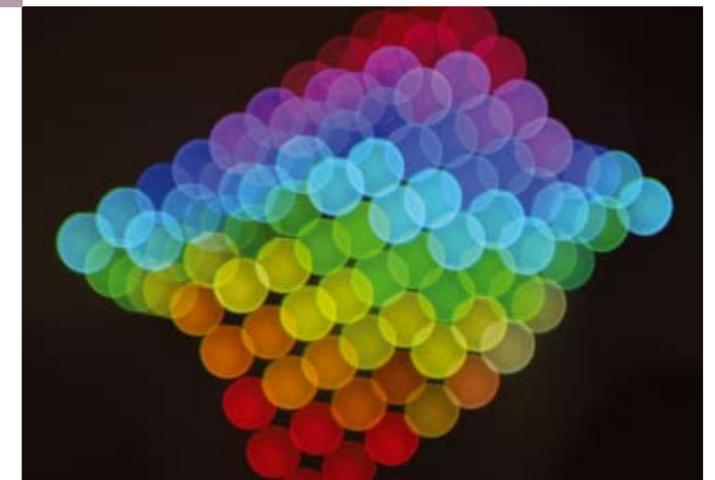
.... in interior design

In the future, window curtains and blinds won't just be used to block out the light. They will be able to replace a drab and overcast day with the soothing patterns of clouds drifting across a sunlit sky, the dappled light of a woodland walk or your very own display of the aurora borealis. And it won't be limited to curtains. Just about anything made of material in your home will eventually become a potential source of mood lighting. [D&W](#)



.... in culture

Lumalive fabrics will give tomorrow's youngsters the ability to instantly customize their clothing with the names of their favorite pop idols or sports stars, and bring a whole new dimension to text and multi-media messaging. And it's not only off-stage that these textiles will have an impact. They will also add a new creative dimension to the performing arts.



**i** Bas Zeper • Philips Research • [photonictextiles@philips.com](mailto:photonictextiles@philips.com)  
 Extra info [www.research.philips.com/password](http://www.research.philips.com/password)  
 Philips Lumalive technology • light-emitting textiles