



# Wearable Authentication Tech via Optical Wireless

TECHNOLOGY NUMBER: 2025-332

[Accelerate Blue Foundry - 2025 \(Physical Sciences\)](#)

## OVERVIEW

Wearable optical device (e.g., smart ring, nail, or watch) that leverages visible light for fast, secure, and energy-efficient real-time communication, user authentication, and environmental sensing—filling critical gaps in security and wireless connectivity for smart homes, hospitals, and classrooms while remaining low-cost and privacy friendly.

## DESCRIPTION

This technology enables a small wearable accessory to exchange data using visible light, rather than traditional radio waves or wires. The core novelty is in its use of special thin films that uniquely interact with polarized light to generate distinctive optical “fingerprints”—each tag has its own. Unlike existing solutions, these films do not require power or complicated electronics; they passively respond to ordinary surrounding light, making the system lightweight, inexpensive, and inherently secure (since the tags are easy to identify by their unique light patterns but hard to spoof or photographically copy). This also allows the wearable device to safely connect and authenticate with other devices (like phones or smart doors), and sense subtle actions with fine precision—all without exposing sensitive biometric data or suffering interference from radio signals.

For more details, watch this teaser video:



## Technology ID

2025-332

## Category

Manufacturing Process  
Software  
Software & Content  
Accelerate Blue Foundry -  
2025/Physical Sciences

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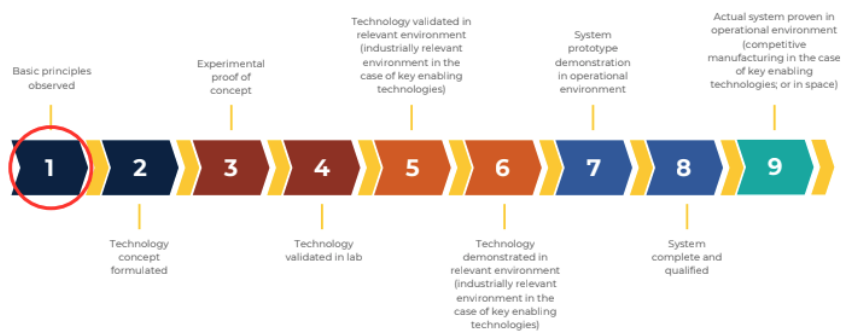


## VALUE PROPOSITION

- **Secure, Low-Power, and Privacy-Centric:** Operates passively using light, requiring no electronics or batteries, and avoids risks tied to storing permanent biometric data.
- **Integrated Multi-Functionality:** Combines communication, sensing, and authentication in one platform, enabling seamless device interaction in smart environments.
- **Cost-Effective and Robust:** Manufactured using simple off-the-shelf materials for under \$0.20 per tag, and works reliably even in places with heavy electromagnetic interference.

## TECHNOLOGY READINESS LEVEL

### Technology Readiness Levels



## MARKET OPPORTUNITY

Modern infrastructures—like smart hospitals, secure offices, classrooms, and connected homes—need fast, secure, and private ways for people and devices to interact and authenticate, especially in environments where radio signals are limited or privacy is paramount. This technology allows for easy, contactless login and secure access control, advanced “human-computer” interactions, and precise device coordination, making it highly attractive for healthcare, education, IoT, and building security sectors. The rise in smart device adoption, privacy regulations, and concerns over existing biometric security form powerful trends supporting this solution’s market relevance.