

(SD2020-422) ScatterMIMO: Enabling Virtual MIMO with Smart Surfaces. ScatterMIMO is a programmable smart surface that contains phase shifters to change the wireless channel

Tech ID: 31973 / UC Case 2020-422-0

BACKGROUND

In the last decade, the bandwidth expansion and MIMO spatial multiplexing have promised to increase data throughput by orders of magnitude. However, we are yet to enjoy such improvement in real-world environments, as they lack rich scattering and preclude effective MIMO spatial multiplexing.

TECHNOLOGY DESCRIPTION

Researchers from UC San Diego patented ScatterMIMO, which uses smart surfaces to increase the scattering in the environment, to provide MIMO spatial multiplexing gain.

Specifically, smart surface pairs up with a wireless transmitter device (say an active AP) and re-radiates the same amount of power as any active access point (AP), thereby creating virtual passive APs.

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OTHER INFORMATION

KEYWORDS

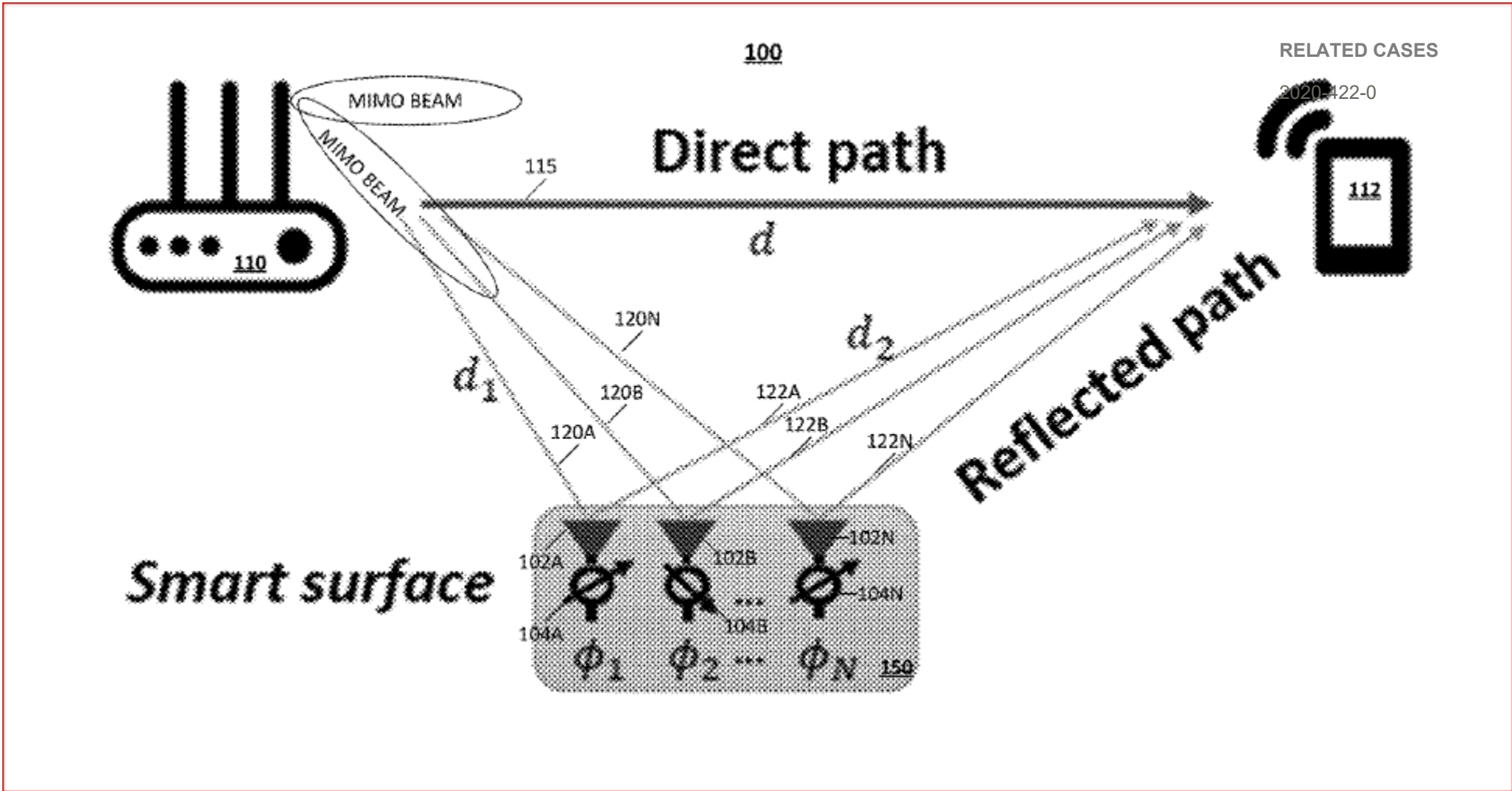
wireless, networking, Wi-Fi, hardware
communication

CATEGORIZED AS

- **Communications**
- Wireless
- **Computer**
- Hardware

RELATED CASES

2020-422-0

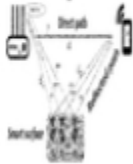


ADVANTAGES

ScatterMIMO avoids the synchronization, interference, and power requirements of conventional distributed MIMO systems by leveraging virtual passive APs, allowing its smart surface to provide spatial multiplexing gain, which can be deployed at a very low cost. We show that with optimal placement, these virtual APs can provide signals to their clients with power comparable to real active APs, and can increase the coverage of an AP. Furthermore, the technology design includes algorithms to optimize ScatterMIMO's smart surface for each client with minimal measurement overhead and to overcome random per-packet phase offsets during the measurement. Initial evaluations show that with commercial off-the-shelf MIMO WiFi (11ac) AP and unmodified clients, ScatterMIMO provides a median throughput improvement of 2 X over the active AP alone.

INTELLECTUAL PROPERTY INFO

US Utility patent issued:11,546,0222 on Jan 3, 2023



Virtual mimo with smart surfaces

US • [US20210344384A1](#) • Manideep Dunna • The Regents Of The University Of California

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CROSS-REFERENCE TO RELATED APPLICATIONS This application claims priority to provisional U.S. application Ser. No. 63/017,573, entitled “ScatterMIMO: Enabling **Virtual MIMO with Smart Surfaces**” and filed Apr. 29, 2020, the contents of which is hereby incorporated by reference in its entirety. ...

<https://patents.google.com/patent/US20210344384A1/en?q=US+2021%2f0344384>

RELATED MATERIALS

► <https://dl.acm.org/doi/abs/10.1145/3372224.3380887#sec-terms> [dl.acm.org] : Manideep Dunna, Chi Zhang, Daniel Sievenpiper, Dinesh Bharadia. ScatterMIMO: Enabling Virtual MIMO with Smart Surfaces. MobiCom '20: Proceedings of the 26th Annual International Conference on Mobile Computing and Networking September 2020 Article No.: 10 Pages 1–14.

PATENT STATUS

Patent Pending