

# Embodied Telepresent Connection

## Exploring Virtual Social Touch Through Pseudohaptics

John Desnoyers-Stewart • Ekaterina R. Stepanova • Pinyao Liu • Alexandra Kitson  
Patrick P. Pennefather • Vladislav Rhyzhov • Bernhard E. Riecke



To learn more:  
[ispace.iat.sfu.ca/project/etc/](https://ispace.iat.sfu.ca/project/etc/)

### Motivation

In search of missing **tactile sensations** in telepresent *virtual reality*, we created Embodied Telepresent Connection (ETC) to explore how we might be able to apply **pseudo-haptics** to elicit an embodied sensation of social touch.

### Design

For ETC we iteratively developed a series of interaction patterns that aim to evoke a sense of telepresent connection. We centered our approach around abstract bodies to go beyond realism to integrate novel and imaginative opportunities to facilitate pseudo-haptic sensations. We began by creating diverse prototypes and iterated towards the interaction patterns shown here.

### Workshops

We interviewed over 50 immersants during demos and somaesthetic workshops prompting them to describe their experience and any sensations.



Participants reaching toward, touching and hugging each other virtually in ETC.

Two participants see each other remotely as ethereal particle bodies.

#### Telepresence

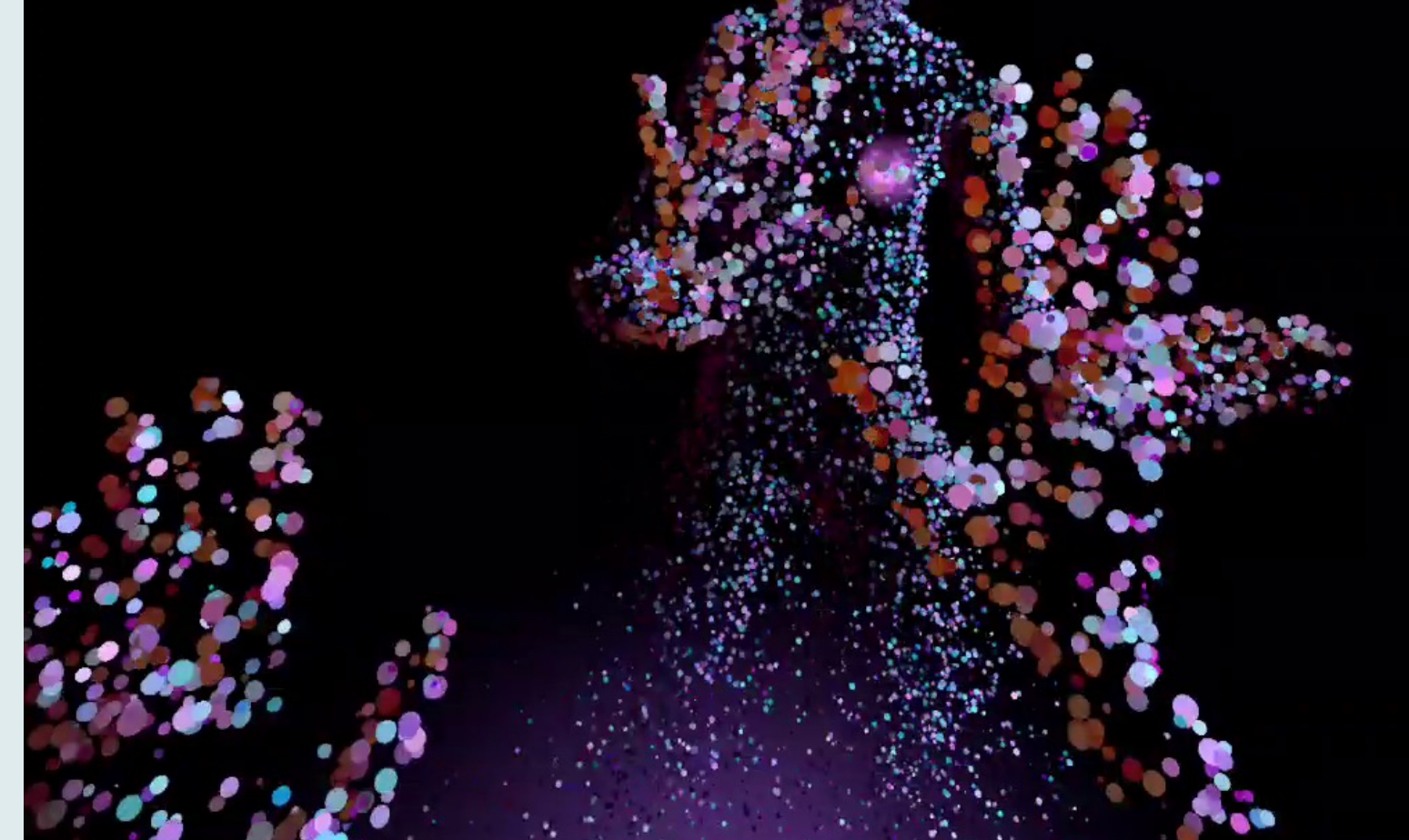
- Photon Pun2 Networking
- VRIK Inverse Kinematics
- VFX Graph Particles



Their avatars respond to proximity through sound and visuals.

#### Proximity

- Visual warmth
- Particle Attraction
- Tremolo Flute



Participants hear a sound and see a small firework as they make contact.

#### Contact

- Mini Fireworks
- Playful Ping



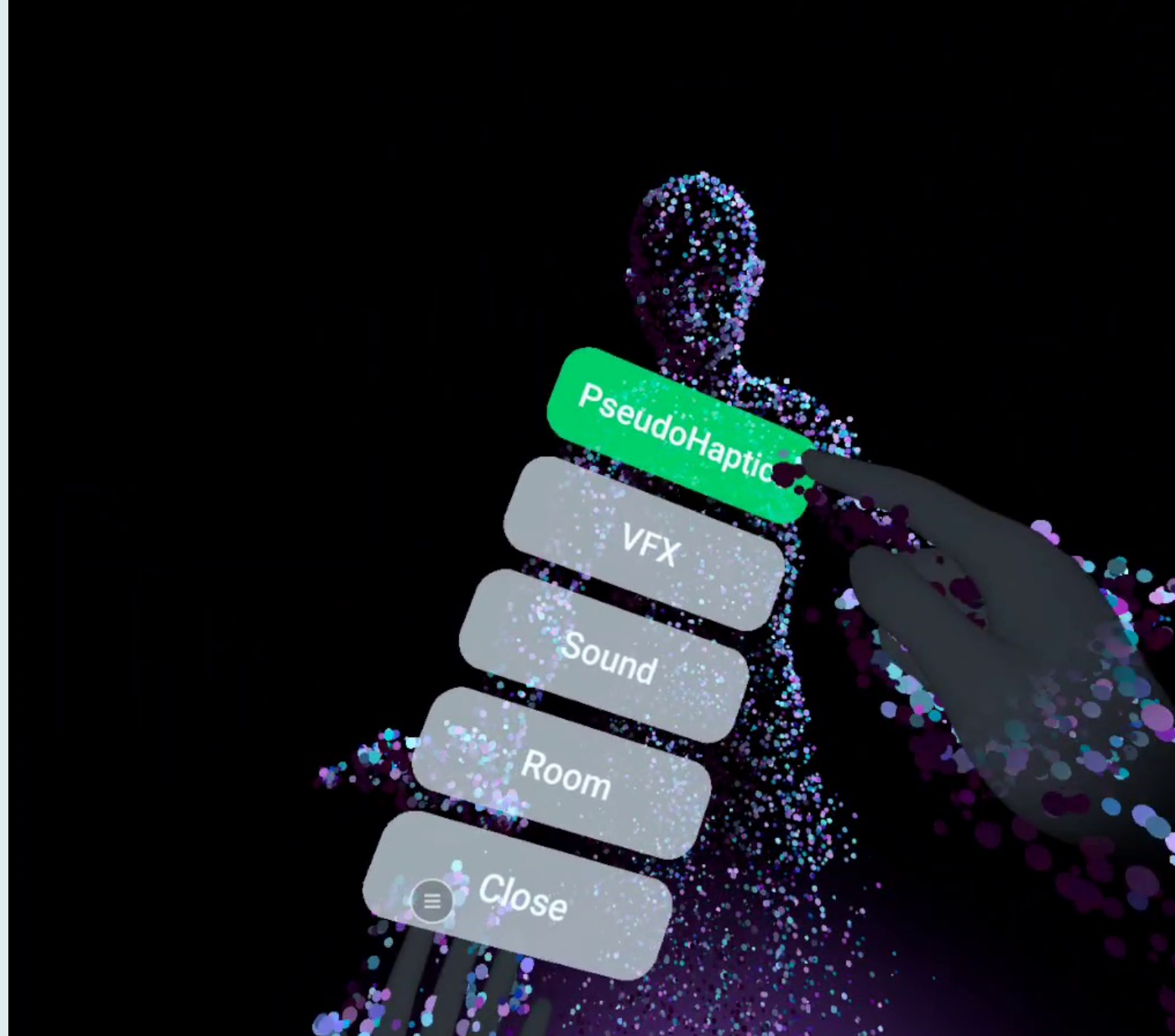
Their bodies resist one another through a physical simulation.

#### Resistance

- HPTK Physics Simulation
- Audio Force-Feedback

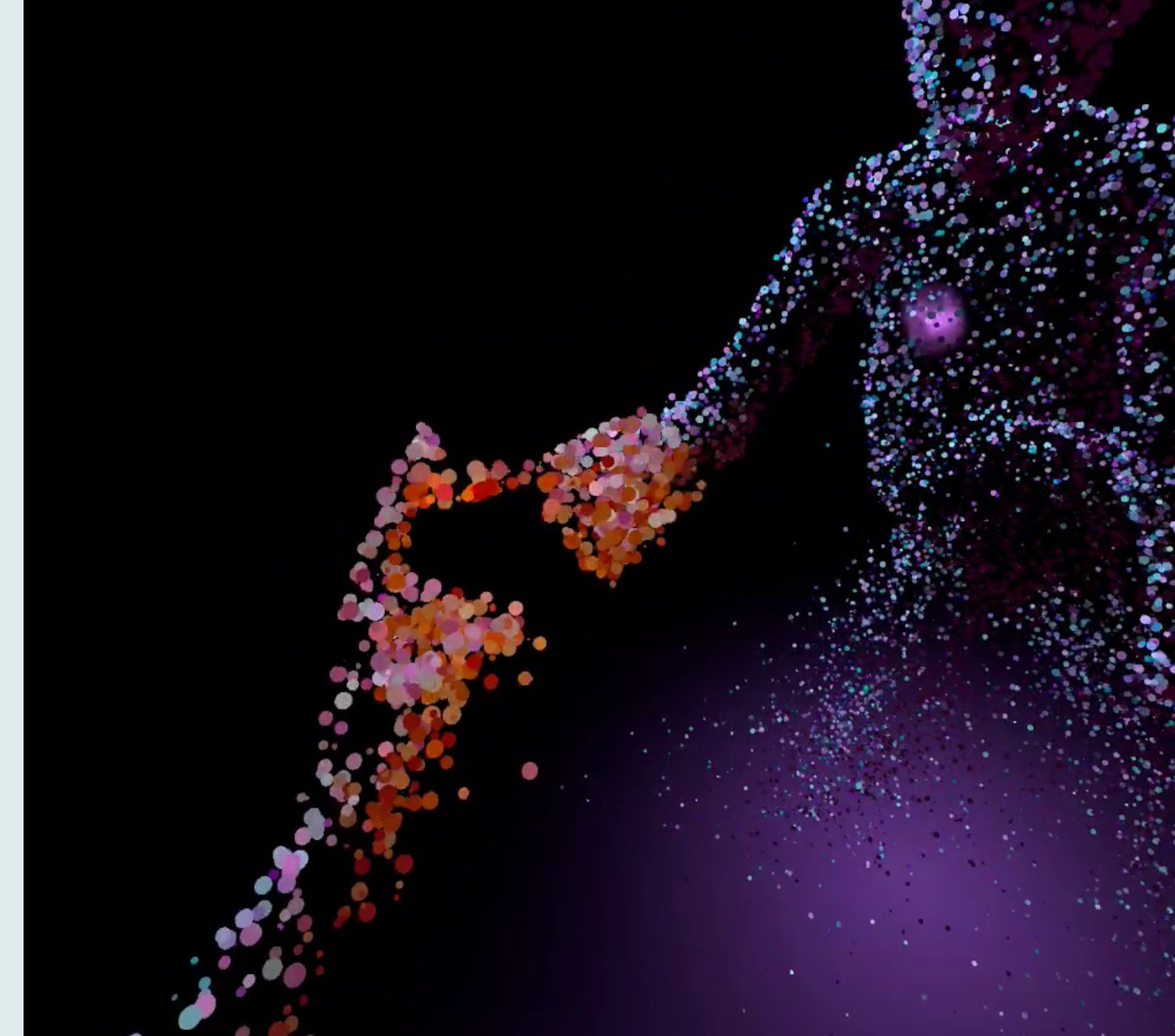


#### Customization



Interactions can be toggled individually allowing for different combinations.

#### Playfulness



Participants play together, exploring how their bodies behave in VR.

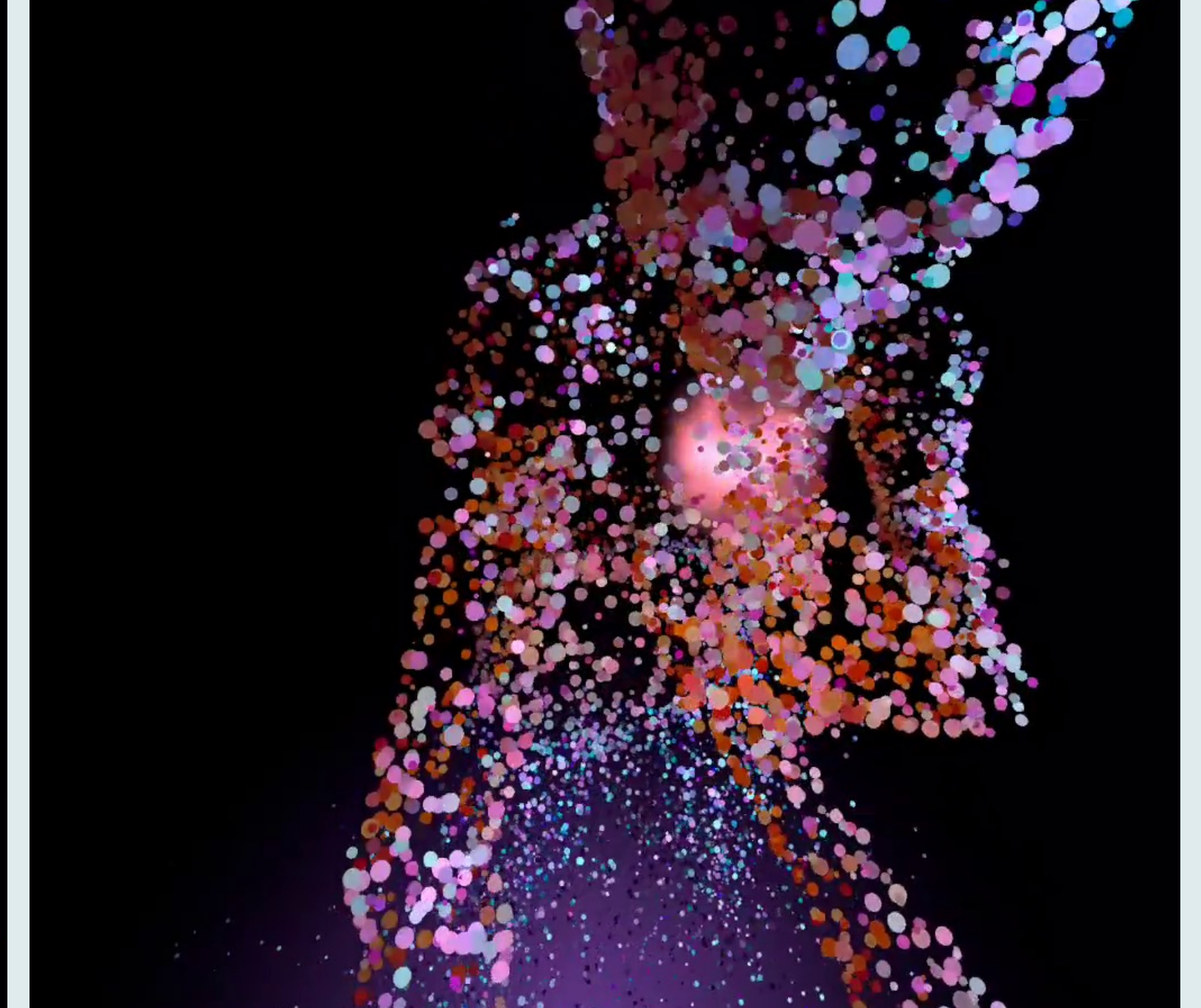
#### Heartbeat

- Apple Watch
- Movesense



A beating heart can be seen inside each body, bringing the avatar to life.

#### Intimacy



The hand acts as a stethoscope that sonifies the other person's heartbeat.

## Observations

#### Faint Bodily Sensations

Participants described faint ineffable tactile sensations of **warmth**, **pressure**, **resistance**, **tingling**, or **texture**.

#### Pseudo-haptic Resistance

The virtual body appeared more **solid and grounded** in reality. Some preferred disabling it for a deeper poetic opportunity for connection by merging bodies.

#### Compounding Senses

Visuals and sounds formed a **single perceptual event** bringing a sense of **realness** and social presence of **another human** on the other end.

#### Touching Hearts

The beating heart drew immersants closer **inviting touch** and eliciting **intimacy** and **representing life** through a **subtle physical presence**.

#### Powerful Experience

ETC elicited strong reactions, sometimes of a beautiful spiritual **connection**, and other times feeling **surreal** and somewhat **uncanny**.

## Conclusions

- Pseudo-haptics afforded a **subtle** and somewhat **uncanny** experience of virtual touch with the potential for **intimate embodied connection**.
- While the subtle sensations of touch supported the realness of social interactions, the **social aspect**, in turn, amplified the physical sensations.
- A pseudo-haptic touch is a distinctly **tactile** sensation with unique qualities that distinguish it from **ordinary physical** touch.
- **Ethereal** avatars are a good fit for the **surreal** experience of virtual touch, especially if the pseudohaptic design is well aligned with the abstract aesthetic.