

Study of Covert Channels in Multi-Photon Quantum Communication Protocol

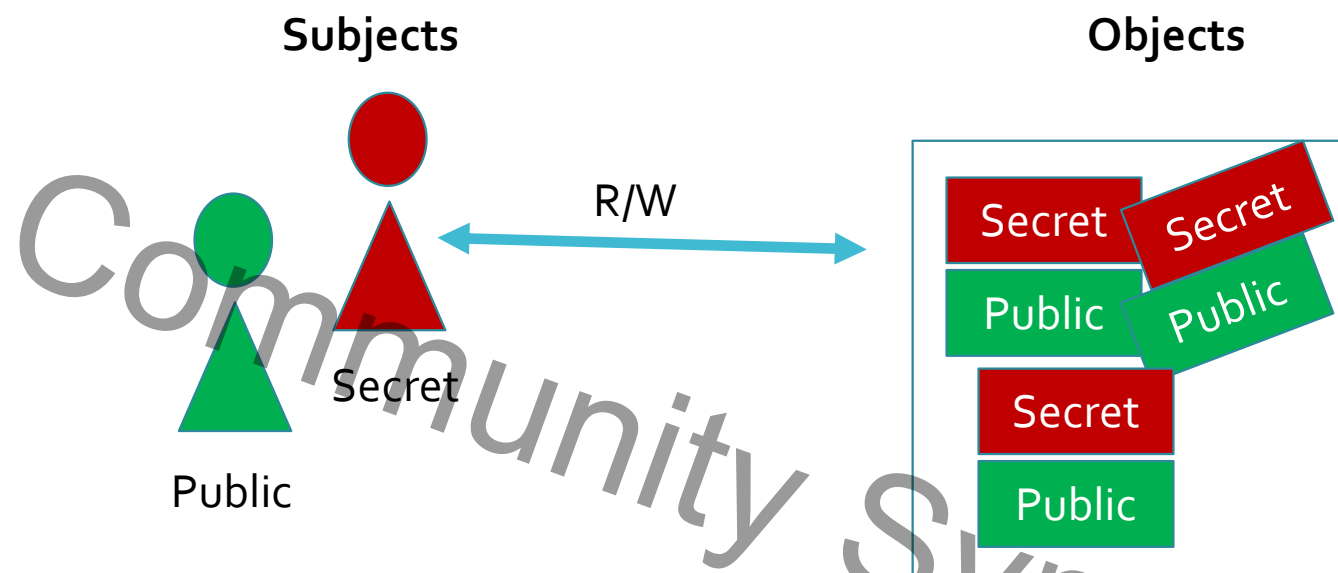
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2024 CAE Community Symposium

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Sensitive Data in Computer Systems



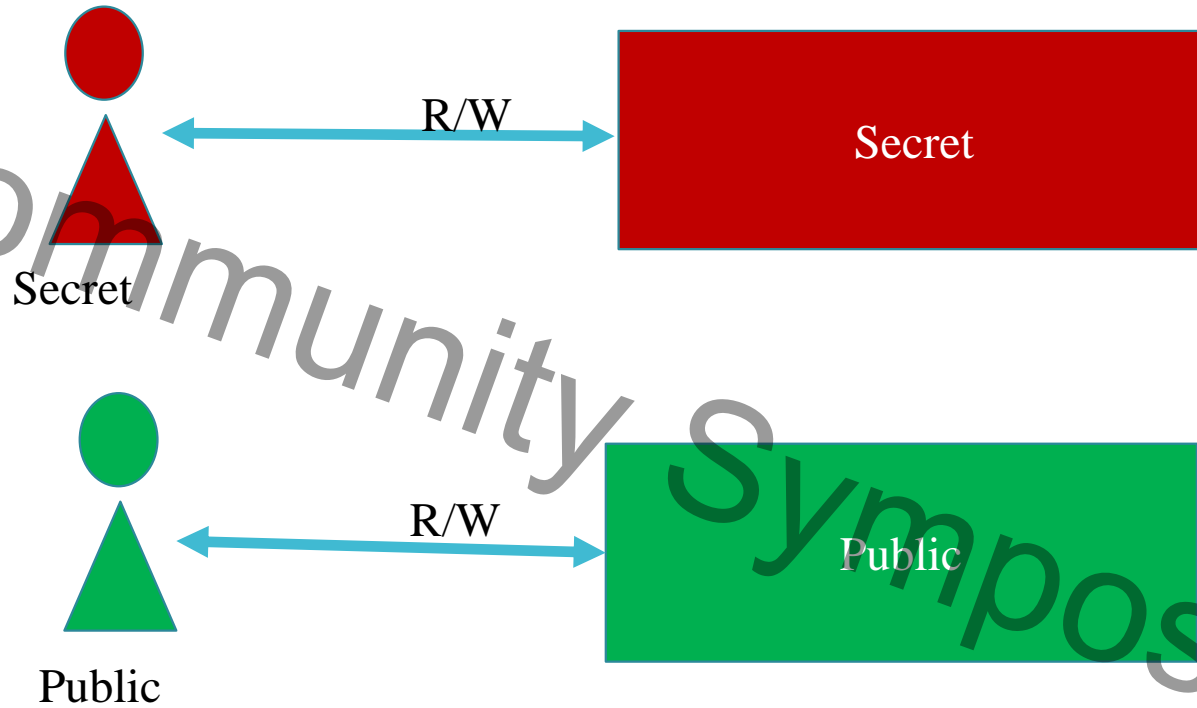
"Secrets get leaked"

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Security
Objective

Subjects

Objects



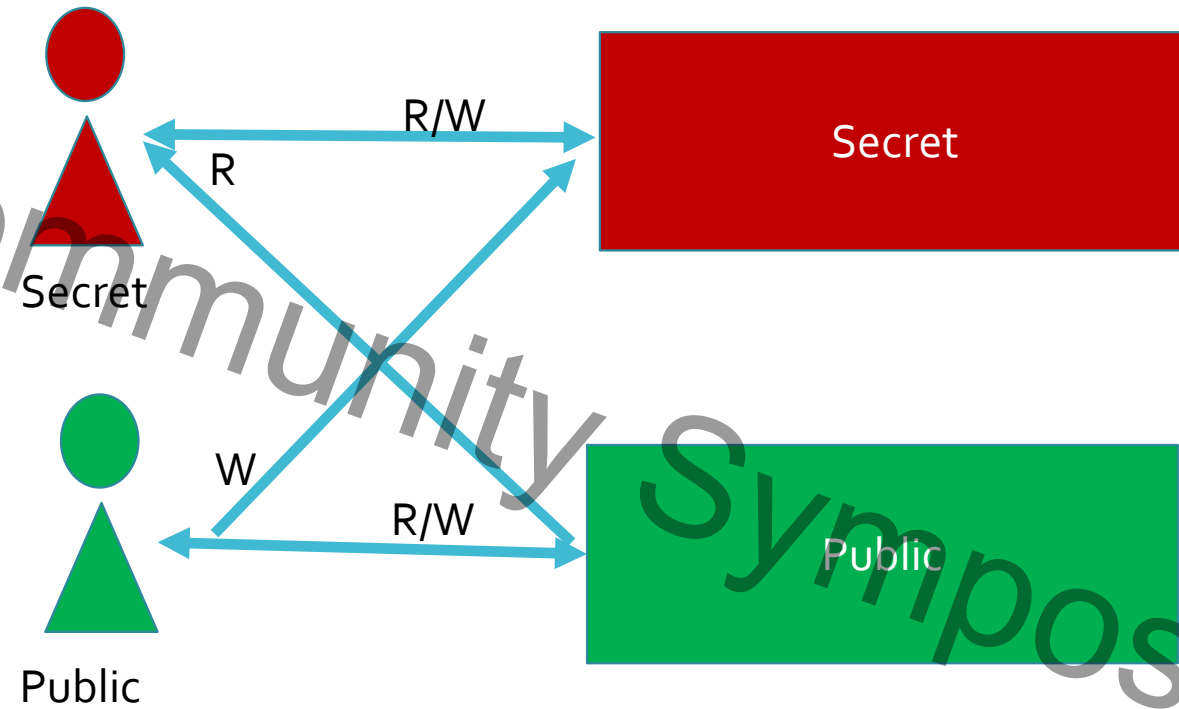
“Prevent Public from Accessing Secret”

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Bell-LaPadula Model

Subjects

Objects



"Read below and write above"

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Covert Timing Channels

Task 1

Task 2

Holding Lock

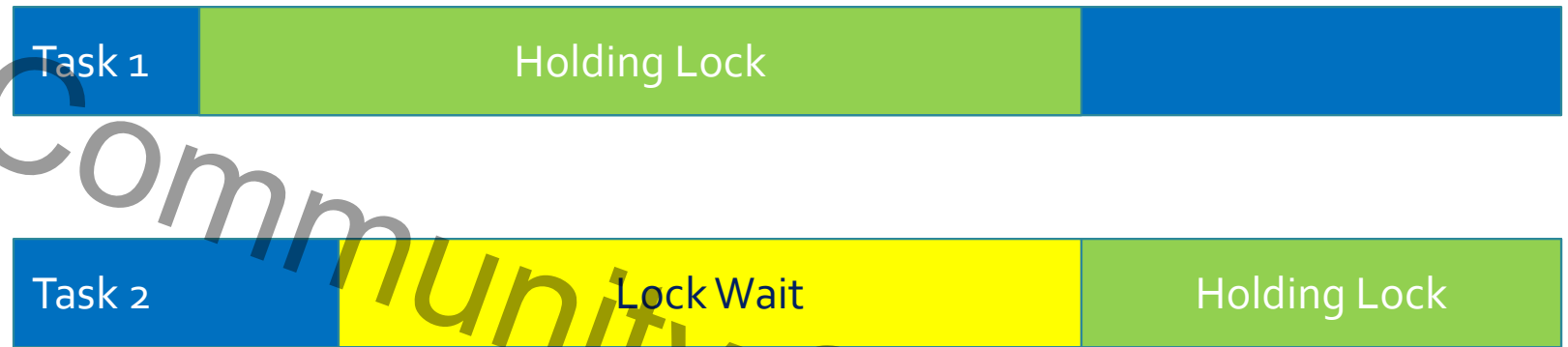
Time =>

Sending a 0



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Covert Timing Channels



Time =>

Sending a 1

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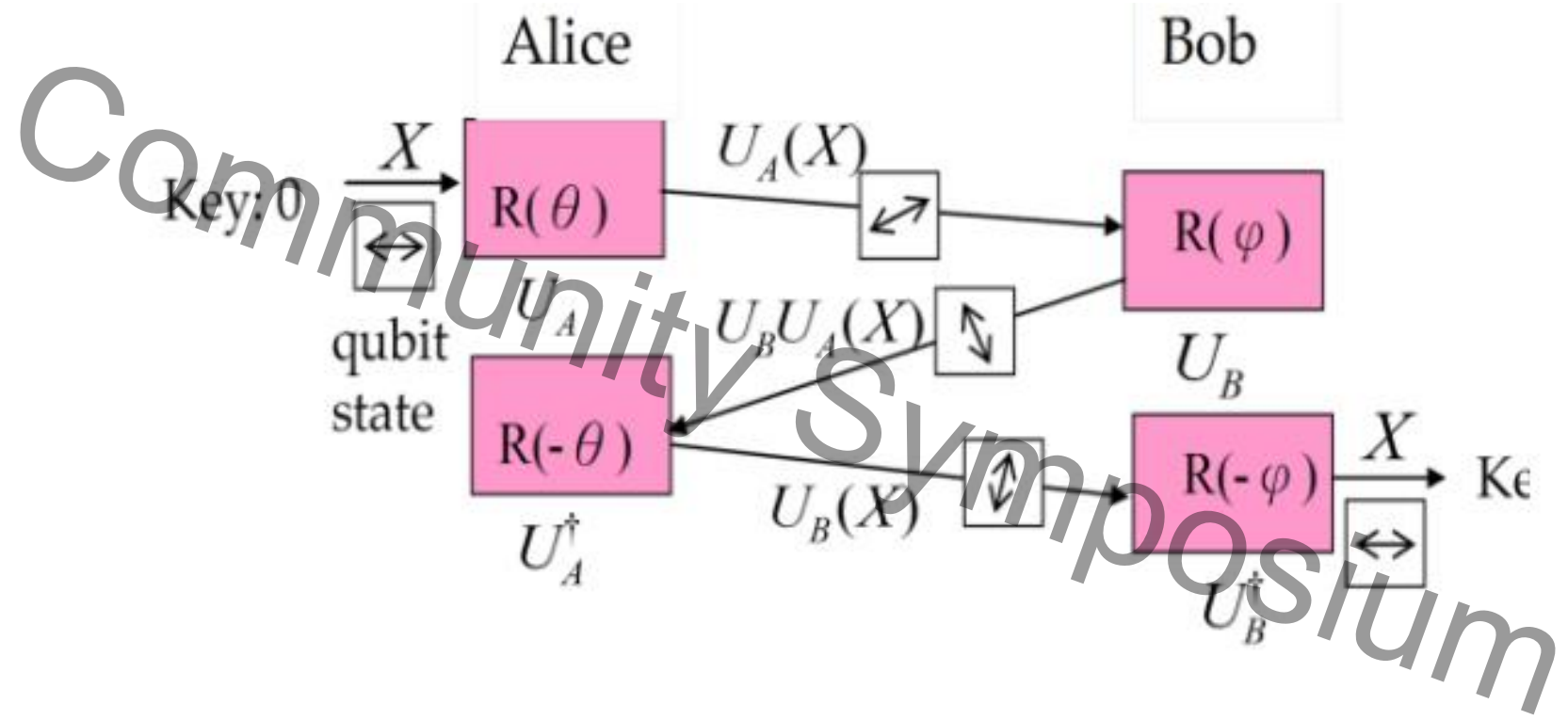
Covert Channel Types

- Timing Channels
- Storage Channels
- History and Prediction Channels

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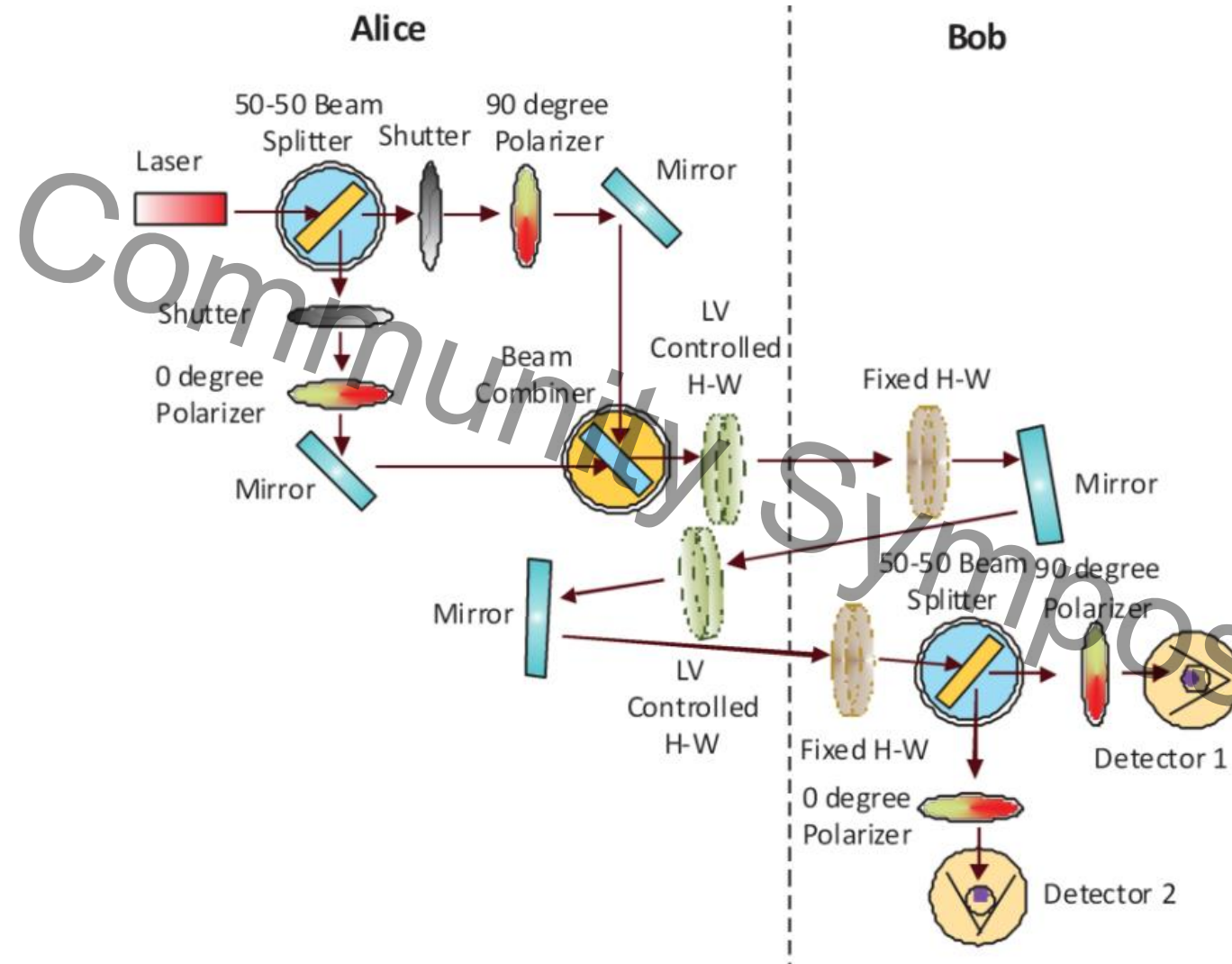
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3-Stage Protocol



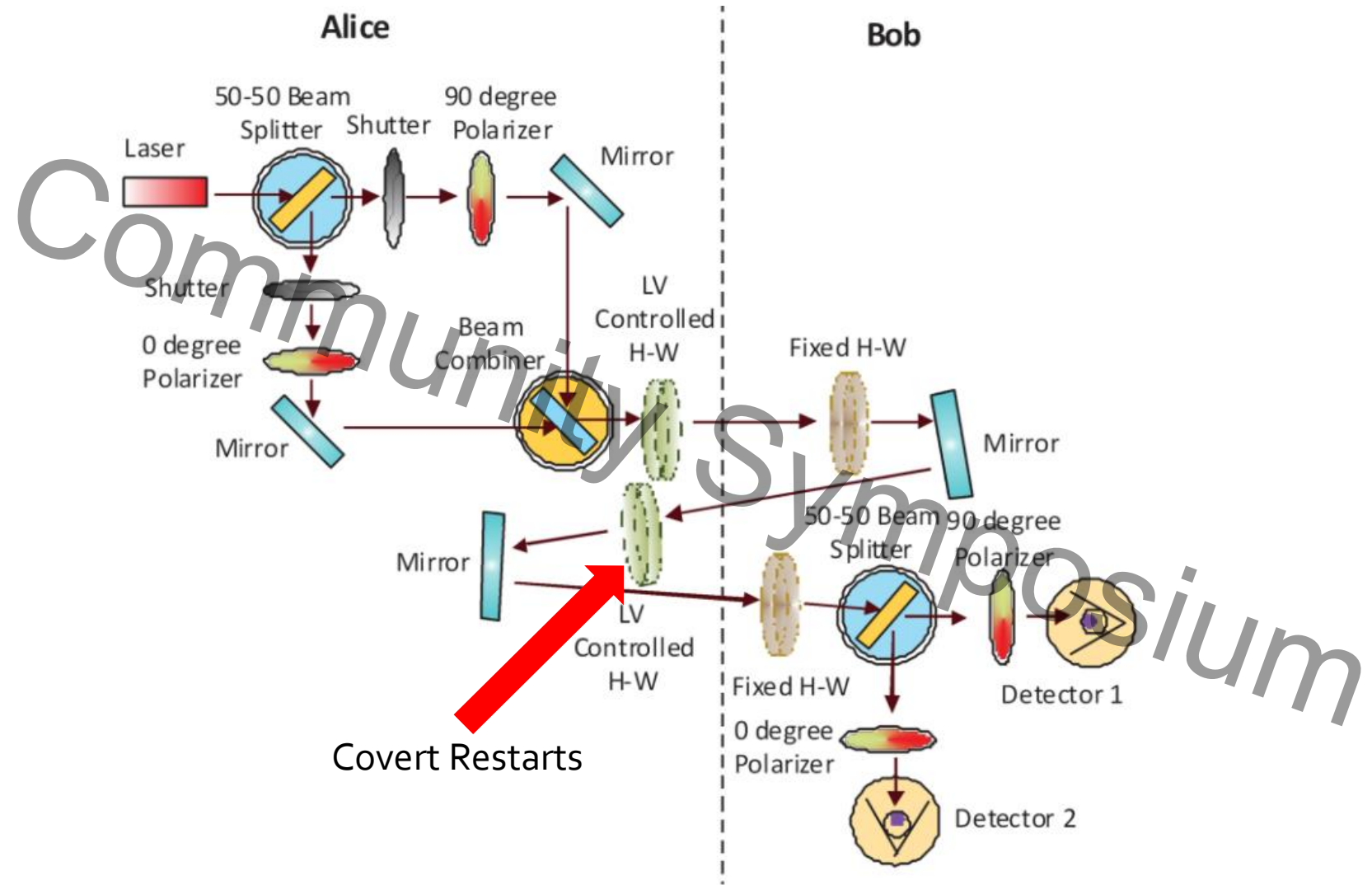
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3-Stage Multi-Photon Experimental Setup



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Covert Channel Introduction



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Proposed Outcomes

- Discovery of Covert Signaling Methods
- Measurement of Bandwidth
- Counter Measures and Development of Secure Protocols
- Undergraduate Student Participation
- Multi-disciplinary/Multi-Departmental/Multi-University Research

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Research Team

- Binto George
- Kishor Kapale
- Sayonnha Mandal
- Nilanjan Sen
- Chunying Zhao

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Thank You!

Swizzle

The
GALT HOUSE
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WALKERS
Exchange