



School of Engineering

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# Vehicle to Vehicle (V2V) Channel Estimation

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### **Problem Statement**

Estimate the channel between two cars in a Straight road (freeway, Urban area, etc.). Channel has four main contributions: (1) LOS (Direct Path) (2) Discrete Mobile Scatters (Other Vehicles) (3) Discrete Static Scatters (Traffic signs, ...) (4) **Diffuse Scatters** (All other small scatterers)

$v_{\max} = \frac{v_R + v_T}{\lambda}$		d 	
		D	<ul> <li>Diffuse (DI)</li> <li>Static discrete (SD)</li> <li>Mobile discrete (MD)</li> </ul>
	- LOS:		• Direct path (LOS) -

## **Estimation Algorithm**





- 2D Sparse-Diffuse Channel Model
- Orthogonal Pilot Design  $\longrightarrow$  Optimal elementwise estimator (Low Complexity!)

#### **Discussion & Simulation**

Significant Improvement compare to LS estimator with the modest complexity of refinement algorithm.



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