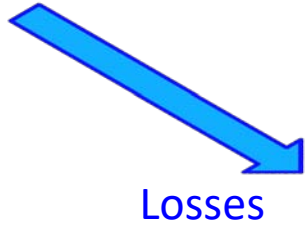

GWIC 3G R&D - Coatings -

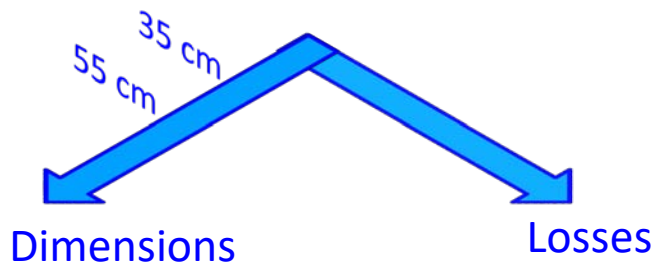
G. Cagnoli, M. Fejer, I. Martin and S. Reid

Parameters space

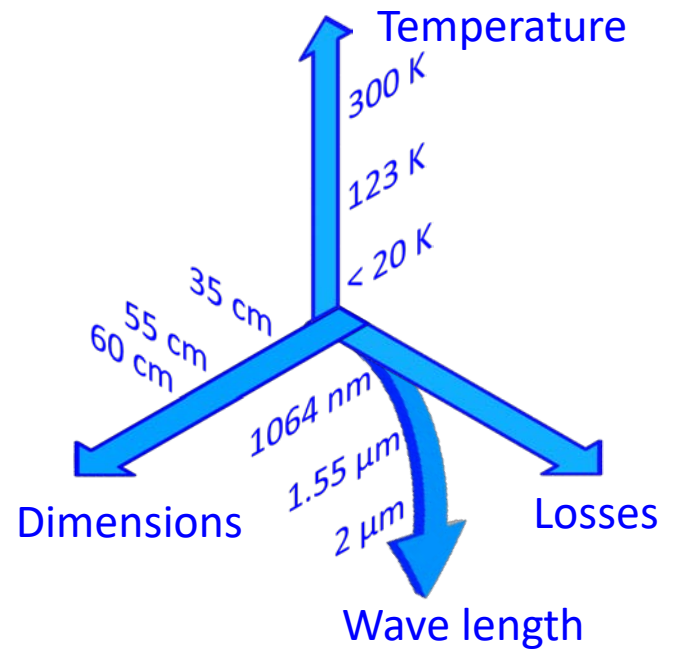
2nd Generation



2nd+ Generation



3rd Generation



The context of Coatings Development

- Materials

Materials	
Amorphous	Crystalline
Oxides	AlGaAs
Nitrides	AlGaP
Fluorides	AlGaN
Silicon	
Mix/alloy	
Nano-layers	

Physics

Amorphous	Crystalline
Ultrastable/ideal glasses	Dislocations
Deposition process	Role of contaminants
Correlation loss-structure	Effect of Stress
Correlation absorption-structure	Mechanical losses from bonding
Role of contaminants	

Metrology

Thermomechanical	Mechanical loss	TN measurement	Optical Characterisation
Elastic constants	Clamped systems	AF cantilevers	Complex indices
Internal stress	Nodal systems	Double paddle	Thermal coefficients
Thermal coefficients	Suspended systems	Direct TN mirrors	

- Deposition and related metrology

Deposition technology	
Amorphous	Crystalline
Uniformity	Uniformity
Parameter optimisation	Parameter optimisation
Point defects/scatterer reduction	Point defect reduction
Post-deposition corrective coatings	Coating transfer
Elevated temperature deposition	Adhesion
Post heat treatment (annealing)	
Nano-layered structures	

The context of Coatings Development

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Nano-layered structures	

Ongoing

Planned

Missing

General remarks on content

- Research on amorphous materials
 - ◆ The planning is well developed
 - ◆ Several groups are involved
 - ◆ Exchange of results is ongoing
- Research on crystalline materials and the related technology
 - ◆ The most advanced technology (AlGaAs) is in the hands of a company
- Developments of amorphous coating deposition and metrology for large optics ($\varnothing \geq 35$ cm)
 - ◆ So far only LMA is concerned