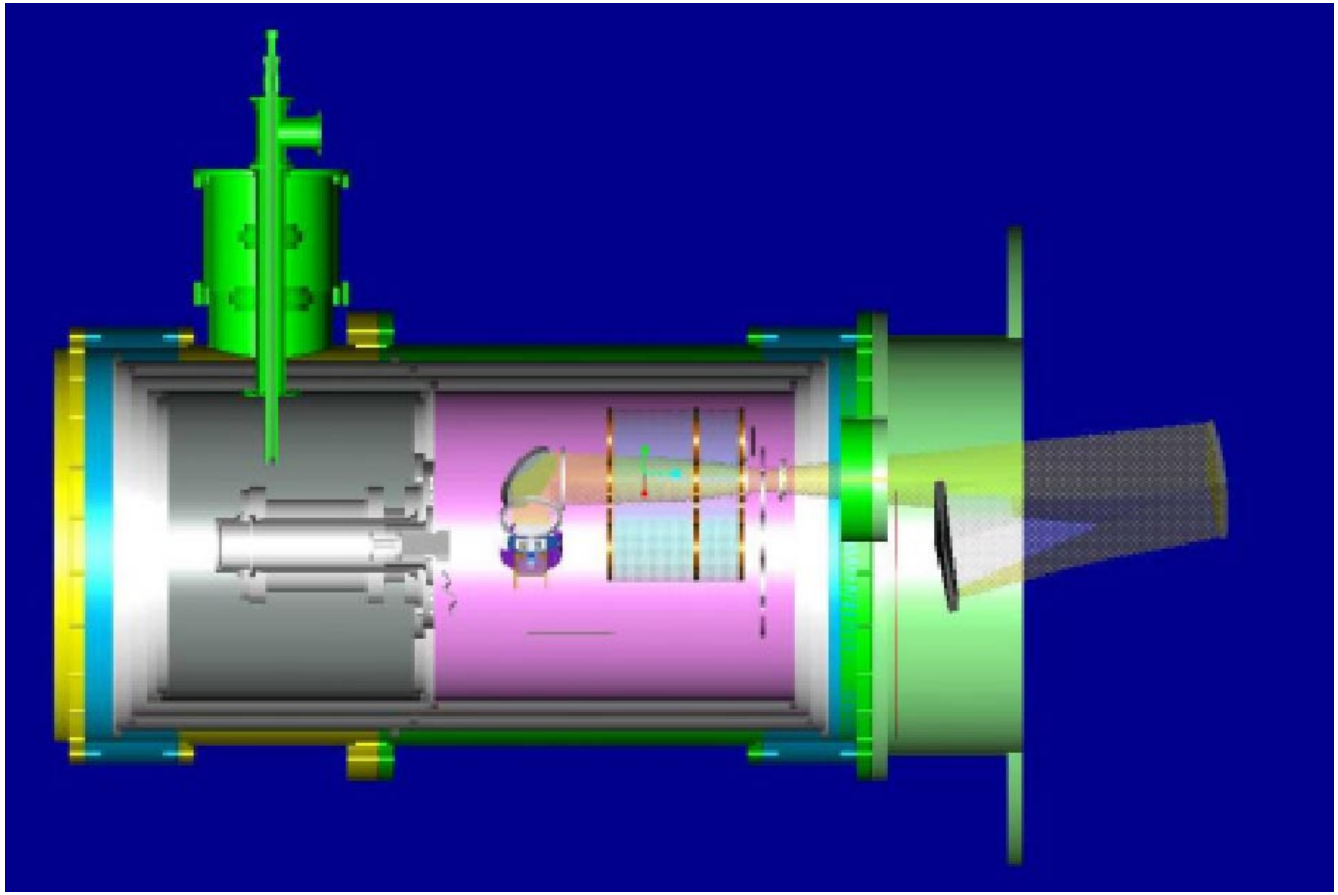
Cryogenic Subsystem Update

Al Harper

Principal Investigator

Helium cryostat design has matured since PDR

- Key design decisions made since PDR
  - Horizontal orientation
  - Non-structural neck tube

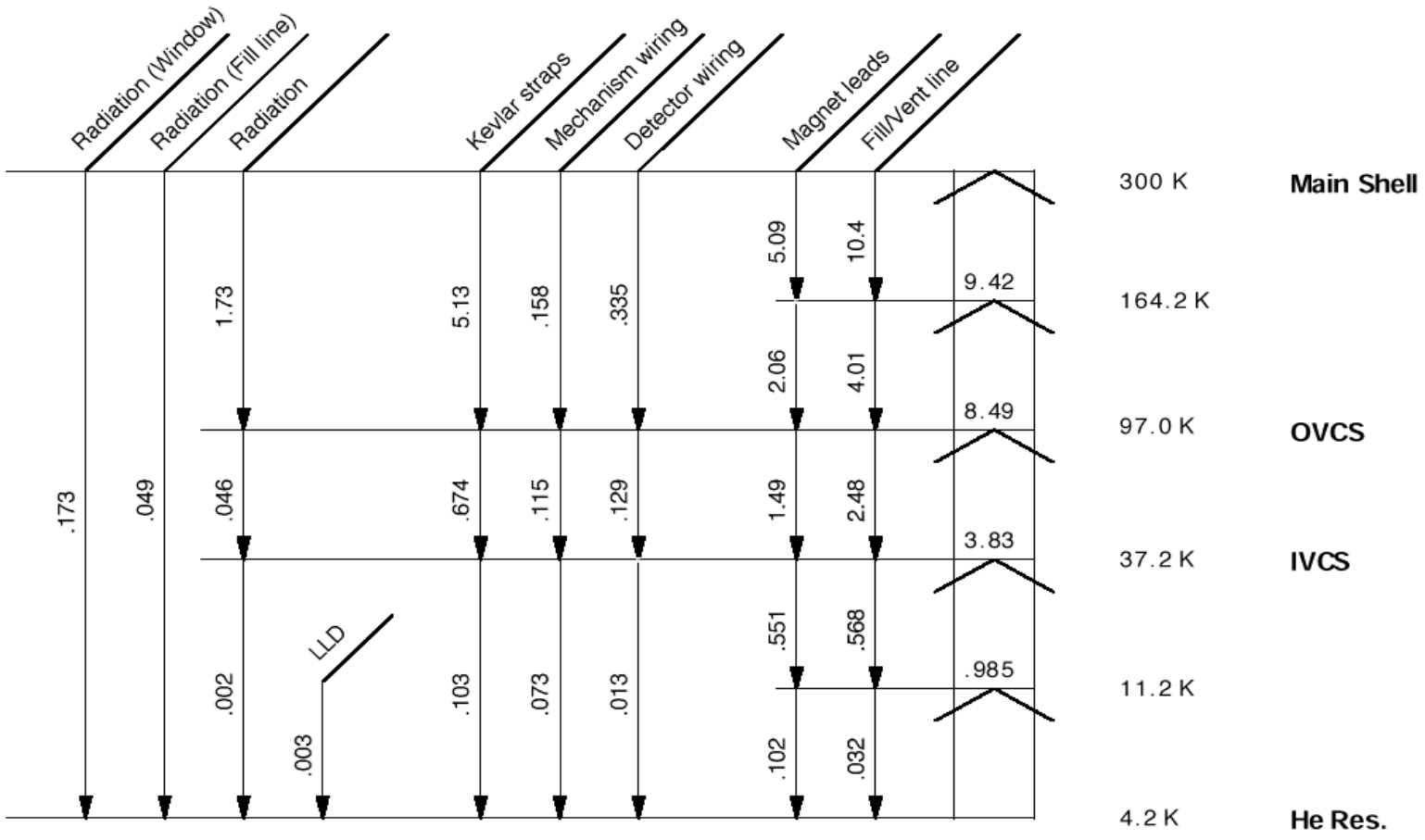


Cryogenic suspension has low deflections and high resonant frequency

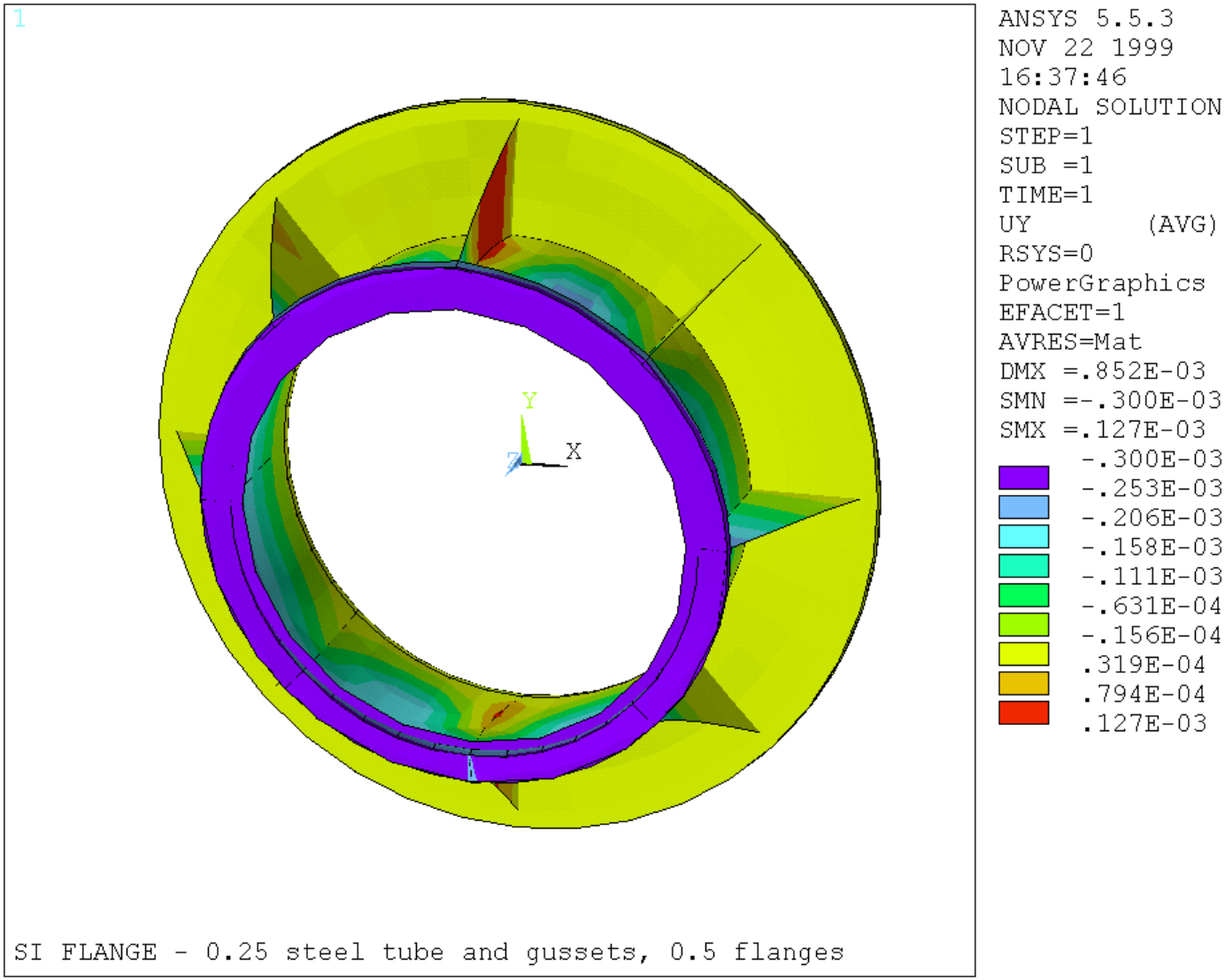
Cryostat Mechanical Model		
	Units	
Elastic Modulus	Pa	1.24E+11
Tensile Strength	Pa	2.76E+09
Diameter	mm	8
Length	mm	100
Number of supporting straps		2
Spring constant	N/m	1.25E+08
Suspended Mass	Kg	70
Extension (at1g)	µm	6
Resonant Frequency	Hz	212
Breaking Acceleration	g	404.3

Thermal performance exceeds requirements

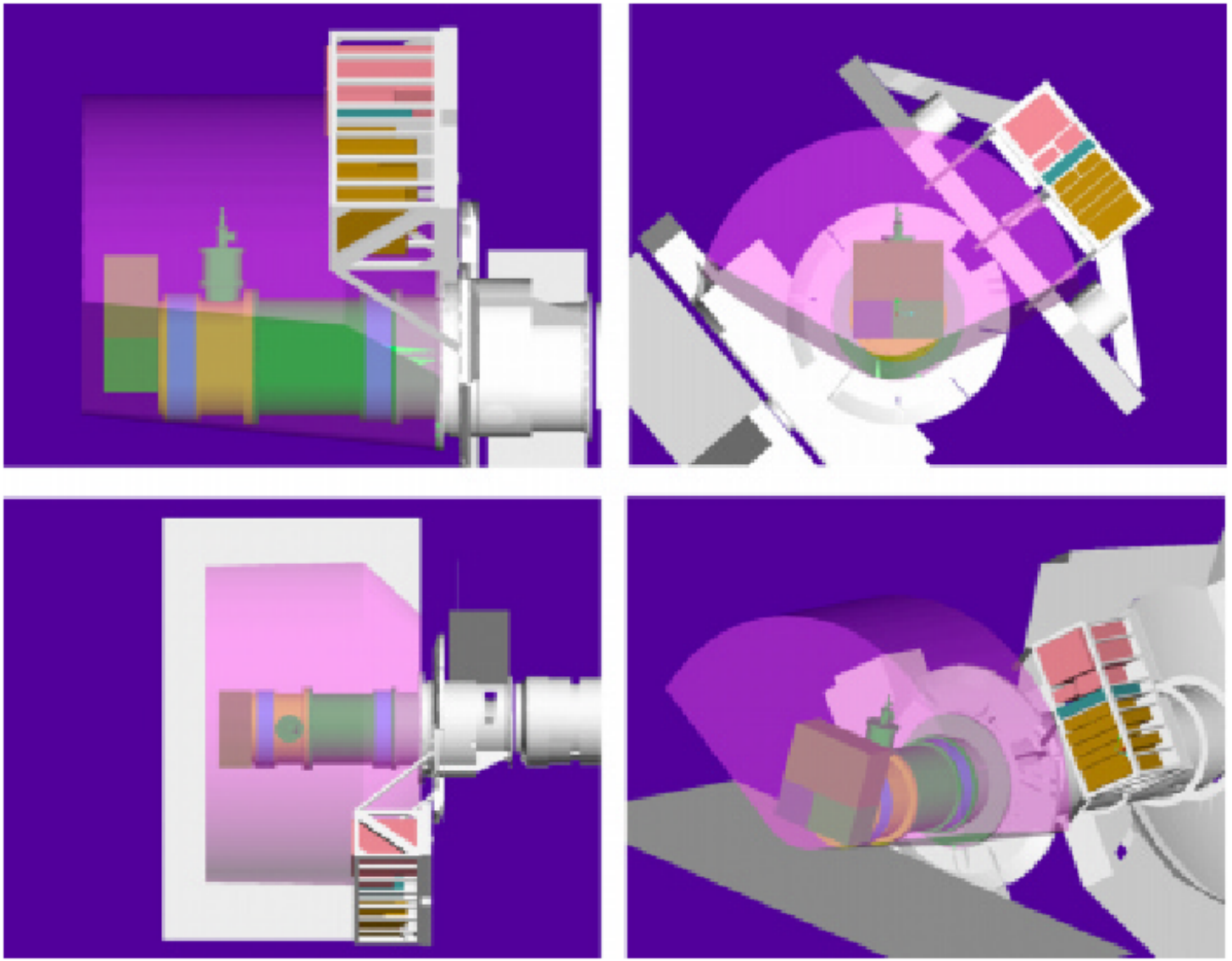
Hold time = 4.33 days for 70-liter reservoir



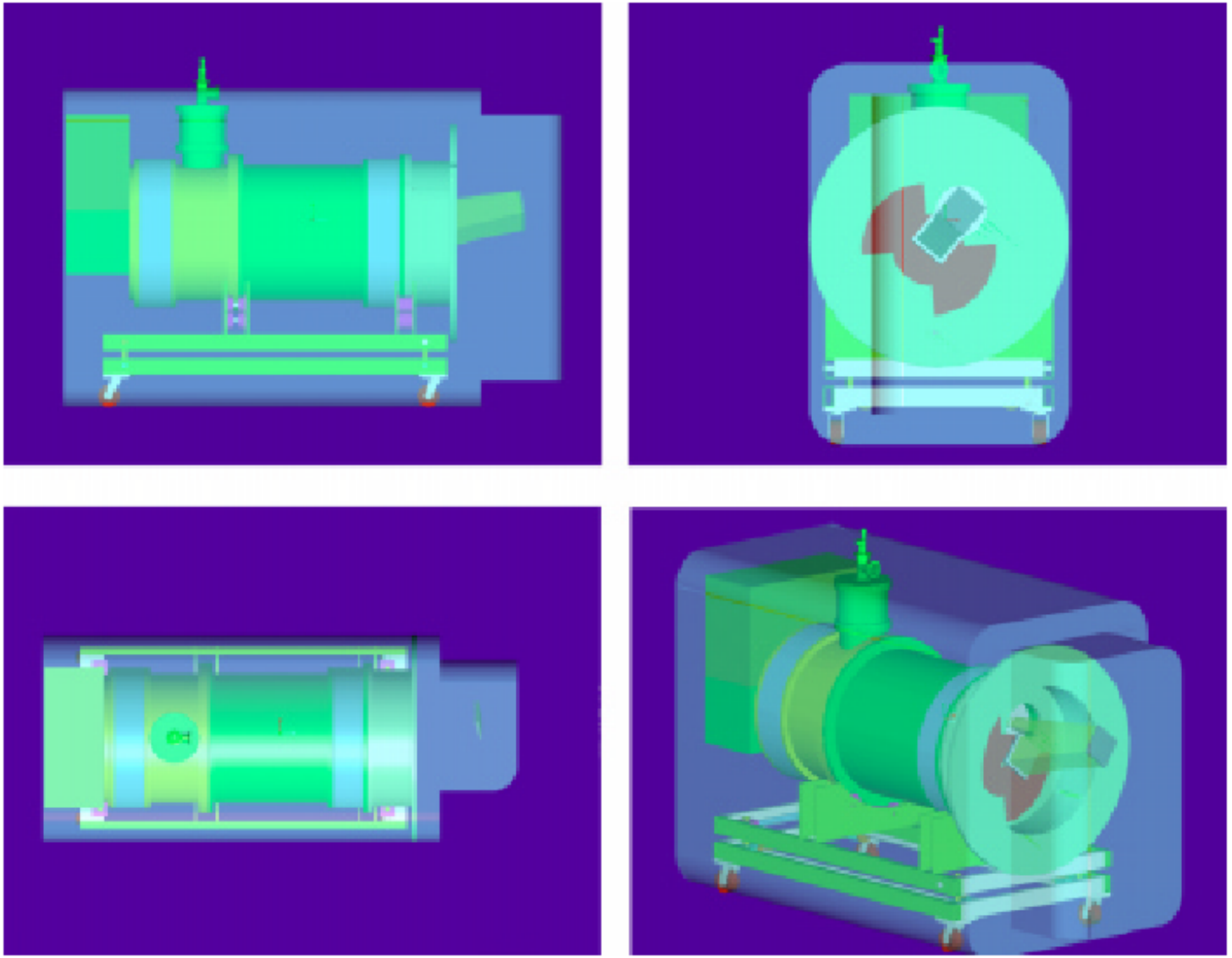
Flange subassembly is very stiff and simple to fabricate



Design fits within operational envelope



Design fits within installation envelope



ADR Subsystem Progress

- Magnet delivered to GSFC
- Salt pill to be delivered 12/1/99
- Heat switch shells in fabrication (delivery~12/6)
- Cold-stage thermometry in fabrication
- Salt-pill suspension design being refined
- Laboratory dewar ready for qualification tests

Cryostat ready to move from preliminary to final design

- Finalize details of major cryostat components
  - Finite element analysis of cryostat shell, shields, and reservoir/optical bench
  - Finalize dimensions and assembly details
- Detail and finalize design of
  - Cryogenic suspension
  - External calibration subsystem mounting and shroud
  - Motion-limit system
  - Cable feedthroughs and routing
- Airworthiness qualification