Welcome

Speaker Information

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- Technical Manager
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Reuter-Stokes
a Baker Hughes business

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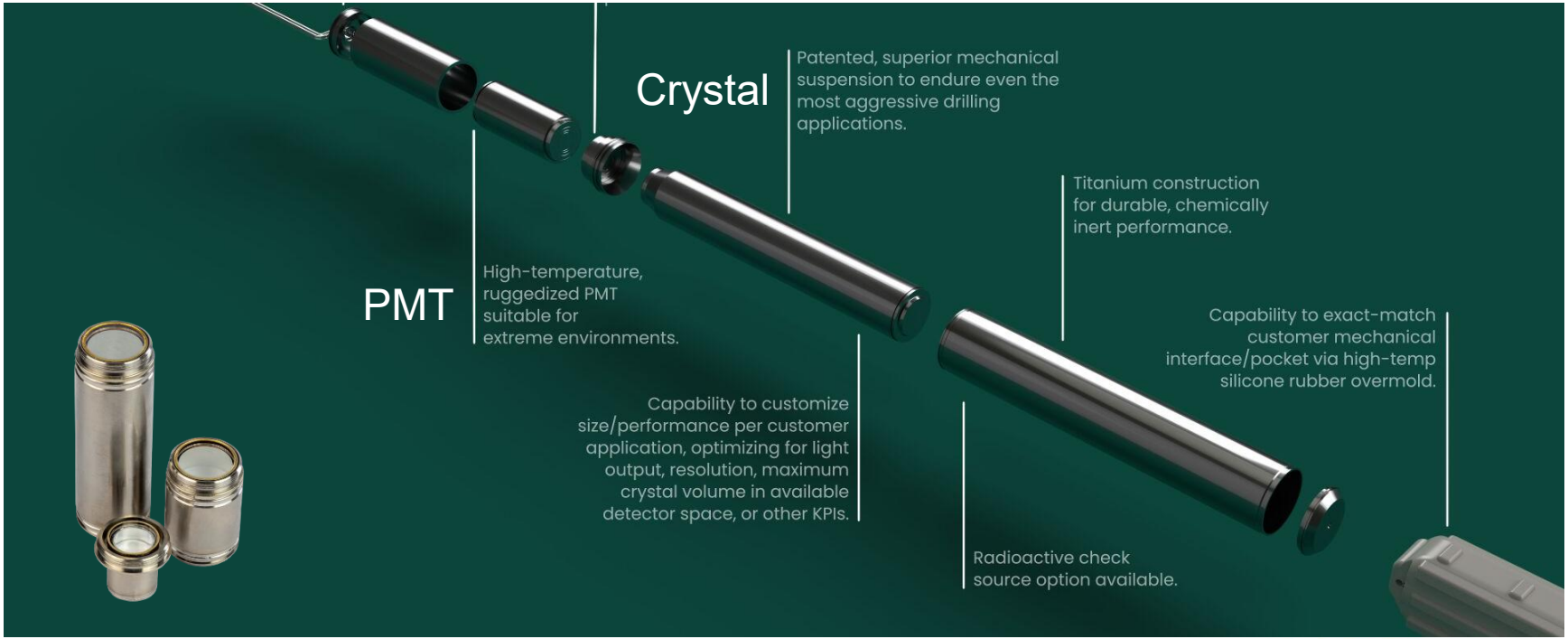
The Anatomy of a Gamma Sensor



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Key Design Parameters

Input	Typical design parameters
Detector sizes	Up to 2” outside diameter Up to 12” length
Temperature	Survival temperature -30C to 185C Operating temperature -20C to 175C
Mechanical stimuli	Vibration up to 20 gRMS, 10 to 1,000 Hz Shock up to 1,000 g 0.5 ms duration
Mounting arrangement	Probe or collar-mounted
Electrical configuration	Crystal pack, PMT, and Electronics
Radioactive source	Cs-137
Testing requirements	PHR, Light Output, Shock and Vibration

Prevalent Requests that Push the Boundaries

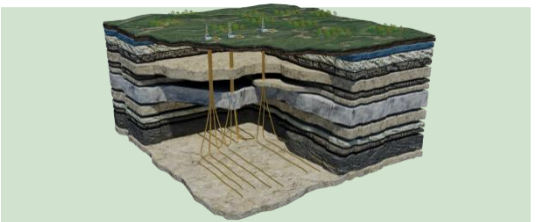
High Temperature / Geothermal

HT electronics
Ceramics & HT materials
Thermal flasks

Extreme Shock and Vibration

Crystal package design
Mounting configuration
Mitigation equipment

Magnetic Interference



Non-magnetic materials
Positioning on the drill string

Potential Solutions | **Technologies in Development**

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Take-Aways

- Gamma sensors rely on a series of connected parts
  - All with limitations that are being challenged today
- Careful consideration of design parameters is key to success
- The industry is constantly pushing the boundaries of sensors and new solutions are still needed
- **Collaboration up and down the value chain is key to ensure that those solutions are being developed**

Thank You