**Contingency Plan / Troubleshooting Guide**

It’s essential for any breakthrough experiment—especially something as new as MBT quantum casting—to plan for null results and systematic troubleshooting. This section gives you a rapid-response playbook for experimenters and collaborators:

**MBT Particle Forge: Troubleshooting and Plan B**

1. No Laser Deflection Observed?
   * Increase Chamber Rotation:

Raise rotational speed incrementally (monitor for mechanical stability and safety at each stage).

* + Change Geometry:

Test alternative chamber shapes (deeper wells, elongated vessels, variable curvature profiles).

* + Adjust Laser Wavelength/Energy:

Try different laser frequencies, including higher photon energies, or use pulsed/femtosecond lasers for more intense field interactions.

* + Optimise Focus:

Add/adjust focusing optics to ensure laser interacts as tightly as possible with the engineered curvature zone.

1. No Material Synthesis/Deposition?
   * Verify Ablation:

Confirm that the ablation target is actually being vaporised and that atoms/molecules are present (optical diagnostics, mass spectrometry).

* + Check Vacuum and Contamination:

Rule out chamber leaks or unexpected contaminants that could disrupt the MBT field or recombination processes.

* + Adjust Timing:

Synchronise material injection with peak field conditions (timing with rotational phase, laser pulse overlap, etc.).

1. Photon Injection Fails to Persist or Capture?
   * Losses in Chamber:

Improve mirror quality, internal surface reflectivity, or add additional photon-trapping optics.

* + Vacuum Level:

Ensure pressure is at ultra-high vacuum to prevent photon scattering or premature absorption.

1. Unexpected Results/Artefacts?
   * Run Control Experiments:

Repeat tests without rotation, or without vacuum, to rule out instrumental or environmental effects.

* + Cross-check with Standard Physics:

Compare all results with classical/GR predictions for sanity checks.

1. Escalation Thresholds:
   * After X (e.g., 3–5) null results with systematic changes, convene review/brainstorming (include outside advisors/peer labs if possible).
   * Document all parameter sweeps for publication and further analysis.

**Summary Statement for the Guide**

The MBT Particle Forge is designed for iterative exploration. Null results in initial runs are not a failure—they’re guidance. Each adjustment (rotation, laser, geometry, timing) is a new data point. The experiment is only “falsified” after exhaustive control checks and parameter sweeps. This makes the protocol robust, credible, and easy for other labs to replicate or extend.