We consider a probability space \((\Omega, \mathcal{C}, P)\) and a self-adjoint operator valued random variable \(A\), taking values in the space of linear operators on a separable Hilbert space \(H\), on it. Suppose \(q^\omega\) is a real valued random variable which is independent of \(A\). We consider a unit vector \(\phi \in H\) and look at the family of operators \(H^\omega = A^\omega + q^\omega P_\phi\), where \(P_\phi\) is the orthogonal projection onto the ray generated by \(\phi\) and \(q^\omega\) is distributed according to a probability measure \(\mu\) (on \(\mathbb{R}\)).

We use the following theorem on the characterization of the continuity properties of a probability measure on \(\mathbb{R}\), for which we define it to be uniformly Hölder continuous with exponent \(0 < \alpha \leq 1\), whenever

\[
\sup_{x \in \mathbb{R}} \sup_{a > 0} \frac{\mu((x-a, x+a))}{a^\alpha} < \infty.
\]

**Theorem 0.1.** Suppose \(\mu\) is a probability measure on \(\mathbb{R}\) and \(\psi\) is a function on \(\mathbb{R}\) which is non-negative, even and satisfies \(|\psi| + |x\psi'| \in L^1(\mathbb{R})\). Then \(\mu\) is uniformly Hölder continuous iff

\[
\sup_{x \in \mathbb{R}} \sup_{a > 0} \frac{1}{a^\alpha} |(\psi_a \ast \mu)(x)| < \infty,
\]

where \(\psi_a(x) = \psi(x/a)\).

Using the above theorem, we prove that for the operators \(H^\omega\) defined above:

**Theorem 0.2.** Consider \(H^\omega\) as above. Let \(E_{H^\omega}\) denote the spectral family associated with the self-adjoint operator and define the measures

\[
\nu^\omega = \int \langle \phi, E_{H^\omega}(\cdot) \phi \rangle \, d\mu(q^\omega).
\]

Then \(\nu^\omega\) is uniformly Hölder continuous whenever \(\mu\) is uniformly Hölder continuous.