

## A GEOMETRIC MODEL FOR EXTENDED PARTICLES

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**Abstract.** Here we combine the ideas of a quantum functional theory intended to describe intrinsically extended particles with those of a geometro-stochastic one describing stochastically extended particles. The main ingredients of the former are a physical wave  $u$  replacing the point  $\mathbf{x}$  and a functional wave  $X[u, t]$  replacing the probability wave function of the conventional quantum theory. The latter introduces a proper wave function accounting for the unavoidable errors in the measurement of continuous observable such as the position and momentum.

### 1. Introduction

In the nineteen fifties of previous century, Destouches [1, 2] developed his functional quantum theory as a generalization of de Broglie's theory. His basic idea was that elementary particles need not be pointlike. Being extended and non rigid is a better conception. Rather than conceiving the particle as a bulk of fluid, we have supposed that it is composed of pointlike quantum modes. This enabled the construction of our **Geometro-Differential Model** (G-D-M) for extended particles and its quantization by a method of induced representation [3, 4, 9, 10]. The geometric structure have been drawn from a recent **Geometro-Stochastic Theory** (G-S-T) which seems to be a candidate for the unification of quantum mechanics and general relativity devoid of many of the inconsistencies of both theories [6–8]. It deals with an extension of particles attributed to the impossibility of sharply measuring a position (or momentum) of a particle. It is a stochastic extension. The aim of the present work is to describe a scheme of the extended particles which incorporate both the intrinsic and stochastic extensions. To achieve this, we shall combine our G-D-M with the G-S-T.