

## A SURVEY OF THE WEYL METRICS

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## 1. INTRODUCTION

Hermann Weyl derived his class of metrics in 1917, just one year after Einstein had presented his now-celebrated general theory of relativity to the world. With the passing of some seventy years since that initial flurry, it is perhaps time to pause and assess what progress has been made with respect to the Weyl metrics. Exactly what is known about them, and what still remains to be done?

From about twenty-five years ago, an interest in the Weyl metrics developed, particularly as exterior solutions in astrophysical problems [1] and as possible final states of gravitational collapse [2],[3]. However, in addition to being of relevance to physics, they are also of interest simply because they present us with the rare opportunity of explicitly determining and investigating a large class of relativistic metrics.

The Weyl metrics are, in principle, all 'known' since there exists a precise algorithm for generating them from an infinite set of Newtonian potential functions. This procedure is given in Section 2. In practice, however, the global structure of only a few such solutions is well understood, and it seems that much work and new insights will be required if this situation is to change.

The member of the Weyl class which is simplest to obtain is the Curzon metric (see Section 2). Yet, despite the ease with which it