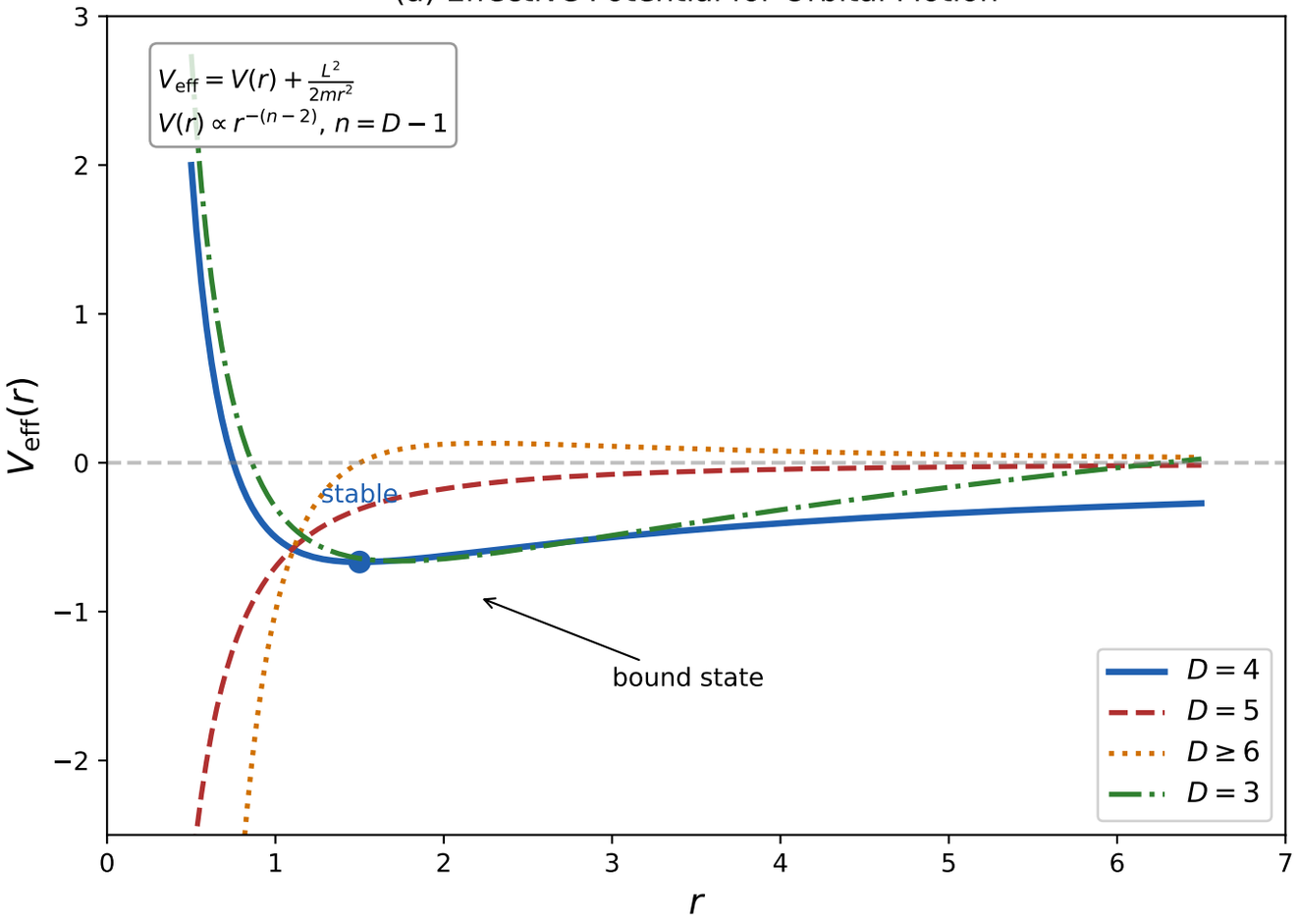
(a) Effective Potential for Orbital Motion



(b) Dimensional Selection: Four Constraints

D	P1: Gravity $n \leq 3$	P2: Atoms $n = 3$	P3: Huygens n odd	P4: Knots $n = 3$	Result
$D = 2$	✓	✗	✓	✗	—
$D = 3$	✓	✗	✗	✗	—
$D = 4$	✓	✓	✓	✓	**D = 4 UNIQUE**
$D = 5$	✗	✗	✗	✗	—
$D = 6$	✗	✗	✓	✗	—
$D = 7$	✗	✗	✗	✗	—

$$\{n \leq 3\} \cap \{n = 3\} \cap \{n \text{ odd}\} \cap \{n = 3\} = \{3\}$$
$$\Rightarrow D = n + 1 = 4$$

(P1) Gravitational stability: stable orbits require $D \leq 4$

(P2) Atomic stability: discrete spectrum requires $D = 4$

(P3) Huygens principle: sharp wave propagation for $D = 2, 4, 6, \ldots$

(P4) Topological complexity: non-trivial knots require $D = 4$