Null Surfaces

S.G. Low
Lorentz Subgroups of U(1,n)
Hamilton mechanics symmetry in the classical limit

IGL(2n+2,R)  HSp(2n)  Sp(2n+2)

O(n)  E(n)  E(n) Force

Velocity
Newtonian Case

All observers in physical states agree on surfaces of simultaneity.
Special Relativity Simultaneity

Events simultaneous for unprimed observer but not for primed
Special Relativity Simultaneity in Phase Space
Reciprocal Relativity Null Surface

\[ r = \text{const} \]
Reciprocal Relativity Simultaneity: the 2nd Lorentz group

Events simultaneous for unprimed observer but not for primed
Null Surface parameters

Special Relativity
\( (v = c, f = 0, r = 0) \)
Null Surface parameters

Special Relativity
(v = c, f = 0, r = 0)

v = 0 plane
f = 0 plane
r = 0 plane

(v = 0, f = b, r = 0)
Null Cones