Cylindrical Coordinates for LASER:

$\boxed{x^\mu}$

$x^0 = t.$
$x^1 = \rho.$
$x^2 = \phi.$
$x^3 = z.$

$\boxed{g_{\mu\nu}}$

$g_{00} = \exp(2A(\rho)).$
$g_{01} = 0.$
$g_{02} = 0.$
$g_{03} = 0.$
$g_{10} = 0.$
$g_{11} = -\exp(2B(\rho)).$
$g_{12} = 0.$
$g_{13} = 0.$
$g_{20} = 0.$
$g_{21} = 0.$
$g_{22} = -\rho^2 \exp(2C(\rho)).$
$g_{23} = 0.$
$g_{30} = 0.$
$g_{31} = 0.$
$g_{32} = 0.$
$g_{33} = -\exp(2D(\rho)).$

$\boxed{\sqrt{} = \sqrt{-\det(g_{\mu\nu})}}$

$\sqrt{} = \sqrt{\exp(2A(\rho))\rho^2 \exp(2D(\rho)) \exp(2C(\rho)) \exp(2B(\rho))}.$

$\boxed{g^{\mu\nu}}$

$g^{00} = \frac{1}{\exp(2A(\rho))}.$
$g^{01} = 0.$
$g^{02} = 0.$
$g^{03} = 0.$
$g^{10} = 0.$
$g^{11} = -\frac{1}{\exp(2B(\rho))}.$
$g^{12} = 0.$
$g^{13} = 0.$
$g^{20} = 0.$
$g^{21} = 0.$
$g^{22} = -\frac{1}{\rho^2 \exp(2C(\rho))}.$
$g^{23} = 0.$
$g^{30} = 0.$
$g^{31} = 0.$
$g^{32} = 0.$
$g^{33} = -\frac{1}{\exp(2D(\rho))}.$

$\boxed{\Gamma^\sigma_{\mu\nu}}$

$\Gamma^0_{00} = 0.$
$\Gamma^0_{01} = A'(\rho).$
$\Gamma^0_{02} = 0.$
$\Gamma^0_{03} = 0.$
$\Gamma^0_{10} = A'(\rho).$
$\Gamma^0_{11} = 0.$
$\Gamma^0_{12} = 0.$
$\Gamma^0_{13} = 0.$
$\Gamma^0_{20} = 0.$
$\Gamma^0_{21} = 0.$
$\Gamma^0_{22} = 0.$
$\Gamma^0_{23} = 0.$
$\Gamma^0_{30} = 0.$
$\Gamma^0_{31} = 0.$
$\Gamma^0_{32} = 0.$
$\Gamma^0_{33} = 0.$

$\Gamma^1_{00} = \frac{A'(\rho)\exp(2A(\rho))}{\exp(2B(\rho))}.$
$\Gamma^1_{01} = 0.$
$\Gamma^1_{02} = 0.$
$\Gamma^1_{03} = 0.$
$\Gamma^1_{10} = 0.$
$\Gamma^1_{11} = B'(\rho).$
$\Gamma^1_{12} = 0.$
$\Gamma^1_{13} = 0.$
$\Gamma^1_{20} = 0.$
$\Gamma^1_{21} = 0.$
$\Gamma^1_{22} = -\frac{\rho^2 \exp(2C(\rho))C'(\rho) + \rho\exp(2C(\rho))}{\exp(2B(\rho))}.$
$\Gamma^1_{23} = 0.$
$\Gamma^1_{30} = 0.$
$\Gamma^1_{31} = 0.$
$\Gamma^1_{32} = 0.$
$\Gamma^1_{33} = -\frac{\exp(2D(\rho))D'(\rho)}{\exp(2B(\rho))}.$

$\Gamma^2_{00} = 0.$
$\Gamma^2_{01} = 0.$
$\Gamma^2_{02} = 0.$
$\Gamma^2_{03} = 0.$
$\Gamma^2_{10} = 0.$
$\Gamma^2_{11} = 0.$
$\Gamma^2_{12} = \frac{1 + \rho C'(\rho)}{\rho}.$
$\Gamma^2_{13} = 0.$
$\Gamma^2_{20} = 0.$
$\Gamma^2_{21} = \frac{1 + \rho C'(\rho)}{\rho}.$
$\Gamma^2_{22} = 0.$
$\Gamma^2_{23} = 0.$
$\Gamma^2_{30} = 0.$
$\Gamma^2_{31} = 0.$
$\Gamma^2_{32} = 0.$
$\Gamma^2_{33} = 0.$

$\Gamma^3_{00} = 0.$
$\Gamma^3_{01} = 0.$
$\Gamma^3_{02} = 0.$
$\Gamma^3_{03} = 0.$
$\Gamma^3_{10} = 0.$
$\Gamma^3_{11} = 0.$
$\Gamma^3_{12} = 0.$
$\Gamma^3_{13} = D'(\rho).$
$\Gamma^3_{20} = 0.$
$\Gamma^3_{21} = 0.$
$\Gamma^3_{22} = 0.$
$\Gamma^3_{23} = 0.$
$\Gamma^3_{30} = 0.$
$\Gamma^3_{31} = D'(\rho).$
$\Gamma^3_{32} = 0.$
$\Gamma^3_{33} = 0.$

$\boxed{R_{\mu\nu}}$

$R_{00} = \frac{A'(\rho)\exp(2A(\rho))\rho B'(\rho) - \exp(2A(\rho))\rho A''(\rho) - A'(\rho)\exp(2A(\rho))\rho C'(\rho) - A'(\rho)^2\exp(2A(\rho))\rho - A'(\rho)\exp(2A(\rho)) - A'(\rho)\exp(2A(\rho))\rho D'(\rho)}{\rho\exp(2B(\rho))}.$
$R_{01} = 0.$
$R_{02} = 0.$
$R_{03} = 0.$
$R_{10} = 0.$
$R_{11} = \frac{A'(\rho)^2\rho - A'(\rho)\rho B'(\rho) + \rho D''(\rho) + \rho A''(\rho) + \rho D'(\rho)^2 + C''(\rho)\rho - \rho D'(\rho)B'(\rho) + \rho C'(\rho)^2 - B'(\rho) - \rho B'(\rho)C'(\rho) + 2C'(\rho)}{\rho}.$
$R_{12} = 0.$
$R_{13} = 0.$
$R_{20} = 0.$
$R_{21} = 0.$
$R_{22} = -\frac{\rho\exp(2C(\rho))B'(\rho) - A'(\rho)\rho\exp(2C(\rho)) - A'(\rho)\rho^2\exp(2C(\rho))C'(\rho) - C''(\rho)\rho^2\exp(2C(\rho)) - \rho^2\exp(2C(\rho))D'(\rho)C'(\rho) - 2\rho\exp(2C(\rho))C'(\rho) + \rho^2\exp(2C(\rho))B'(\rho)C'(\rho) - \rho\exp(2C(\rho))D'(\rho) - \rho^2\exp(2C(\rho))C'(\rho)^2}{\exp(2B(\rho))}.$
$R_{23} = 0.$
$R_{30} = 0.$
$R_{31} = 0.$
$R_{32} = 0.$
$R_{33} = \frac{A'(\rho)\rho\exp(2D(\rho))D'(\rho) + \exp(2D(\rho))D'(\rho) + \rho\exp(2D(\rho))D'(\rho)C'(\rho) + \rho D''(\rho)\exp(2D(\rho)) + \rho\exp(2D(\rho))D'(\rho)^2 - \rho\exp(2D(\rho))D'(\rho)B'(\rho)}{\rho\exp(2B(\rho))}.$

$\boxed{R^\mu_{\ \nu}}$

$R^0_{\ 0} = -\frac{A'(\rho)C'(\rho)}{\exp(2B(\rho))} - \frac{A'(\rho)D'(\rho)}{\exp(2B(\rho))} - \frac{A'(\rho)^2}{\exp(2B(\rho))} + \frac{A'(\rho)B'(\rho)}{\exp(2B(\rho))} - \frac{A'(\rho)}{\rho\exp(2B(\rho))} - \frac{A''(\rho)}{\exp(2B(\rho))}.$
$R^0_{\ 1} = 0.$
$R^0_{\ 2} = 0.$
$R^0_{\ 3} = 0.$
$R^1_{\ 0} = 0.$
$R^1_{\ 1} = -\frac{C'(\rho)^2}{\exp(2B(\rho))} - \frac{C''(\rho)}{\exp(2B(\rho))} + \frac{D'(\rho)B'(\rho)}{\exp(2B(\rho))} - 2\frac{C'(\rho)}{\rho\exp(2B(\rho))} - \frac{D'(\rho)^2}{\exp(2B(\rho))} - \frac{A'(\rho)^2}{\exp(2B(\rho))} + \frac{B'(\rho)}{\rho\exp(2B(\rho))} + \frac{B'(\rho)C'(\rho)}{\exp(2B(\rho))} + \frac{A'(\rho)B'(\rho)}{\exp(2B(\rho))} - \frac{D''(\rho)}{\exp(2B(\rho))} - \frac{A''(\rho)}{\exp(2B(\rho))}.$
$R^1_{\ 2} = 0.$
$R^1_{\ 3} = 0.$
$R^2_{\ 0} = 0.$
$R^2_{\ 1} = 0.$
$R^2_{\ 2} = -\frac{D'(\rho)C'(\rho)}{\exp(2B(\rho))} - \frac{C'(\rho)^2}{\exp(2B(\rho))} - \frac{C''(\rho)}{\exp(2B(\rho))} - 2\frac{C'(\rho)}{\rho\exp(2B(\rho))} - \frac{A'(\rho)C'(\rho)}{\exp(2B(\rho))} - \frac{D'(\rho)}{\rho\exp(2B(\rho))} + \frac{B'(\rho)}{\rho\exp(2B(\rho))} + \frac{B'(\rho)C'(\rho)}{\exp(2B(\rho))} - \frac{A'(\rho)}{\rho\exp(2B(\rho))}.$
$R^2_{\ 3} = 0.$
$R^3_{\ 0} = 0.$
$R^3_{\ 1} = 0.$
$R^3_{\ 2} = 0.$
$R^3_{\ 3} = -\frac{D'(\rho)C'(\rho)}{\exp(2B(\rho))} + \frac{D'(\rho)B'(\rho)}{\exp(2B(\rho))} - \frac{D'(\rho)^2}{\exp(2B(\rho))} - \frac{D'(\rho)}{\rho\exp(2B(\rho))} - \frac{A'(\rho)D'(\rho)}{\exp(2B(\rho))} - \frac{D''(\rho)}{\exp(2B(\rho))}.$

$\boxed{R}$

$R = -2\frac{D'(\rho)C'(\rho)}{\exp(2B(\rho))} - 2\frac{C'(\rho)^2}{\exp(2B(\rho))} - 2\frac{C''(\rho)}{\exp(2B(\rho))} + 2\frac{D'(\rho)B'(\rho)}{\exp(2B(\rho))} - 4\frac{C'(\rho)}{\rho\exp(2B(\rho))} - 2\frac{D'(\rho)^2}{\exp(2B(\rho))} - 2\frac{A'(\rho)C'(\rho)}{\exp(2B(\rho))} - 2\frac{D'(\rho)}{\rho\exp(2B(\rho))} - 2\frac{A'(\rho)D'(\rho)}{\exp(2B(\rho))} - 2\frac{A'(\rho)^2}{\exp(2B(\rho))} + 2\frac{B'(\rho)}{\rho\exp(2B(\rho))} + 2\frac{B'(\rho)C'(\rho)}{\exp(2B(\rho))} + 2\frac{A'(\rho)B'(\rho)}{\exp(2B(\rho))} - 2\frac{A'(\rho)}{\rho\exp(2B(\rho))} - 2\frac{D''(\rho)}{\exp(2B(\rho))} - 2\frac{A''(\rho)}{\exp(2B(\rho))}.$

$\boxed{G^{\mu}_{\nu}}$

$G^{0}_{0} = \frac{D'(\rho)C'(\rho)}{\exp(2B(\rho))} + \frac{C'(\rho)^2}{\exp(2B(\rho))} + \frac{C''(\rho)}{\exp(2B(\rho))} - \frac{D'(\rho)B'(\rho)}{\exp(2B(\rho))} + 2\frac{C'(\rho)}{\rho\exp(2B(\rho))} + \frac{D'(\rho)^2}{\exp(2B(\rho))} + \frac{D'(\rho)}{\rho\exp(2B(\rho))} - \frac{B'(\rho)}{\rho\exp(2B(\rho))} - \frac{B'(\rho)C'(\rho)}{\exp(2B(\rho))} + \frac{D''(\rho)}{\exp(2B(\rho))}.$

$G^{0}_{1} = 0.$

$G^{0}_{2} = 0.$

$G^{0}_{3} = 0.$

$G^{1}_{0} = 0.$

$G^{1}_{1} = \frac{D'(\rho)C'(\rho)}{\exp(2B(\rho))} + \frac{A'(\rho)C'(\rho)}{\exp(2B(\rho))} + \frac{D'(\rho)}{\rho\exp(2B(\rho))} + \frac{A'(\rho)D'(\rho)}{\exp(2B(\rho))} + \frac{A'(\rho)}{\rho\exp(2B(\rho))}.$

$G^{1}_{2} = 0.$

$G^{1}_{3} = 0.$

$G^{2}_{0} = 0.$

$G^{2}_{1} = 0.$

$G^{2}_{2} = -\frac{D'(\rho)B'(\rho)}{\exp(2B(\rho))} + \frac{D'(\rho)^2}{\exp(2B(\rho))} + \frac{A'(\rho)D'(\rho)}{\exp(2B(\rho))} + \frac{A'(\rho)^2}{\exp(2B(\rho))} - \frac{A'(\rho)B'(\rho)}{\exp(2B(\rho))} + \frac{D''(\rho)}{\exp(2B(\rho))} + \frac{A''(\rho)}{\exp(2B(\rho))}.$

$G^{2}_{3} = 0.$

$G^{3}_{0} = 0.$

$G^{3}_{1} = 0.$

$G^{3}_{2} = 0.$

$G^{3}_{3} = \frac{C'(\rho)^2}{\exp(2B(\rho))} + \frac{C''(\rho)}{\exp(2B(\rho))} + 2\frac{C'(\rho)}{\rho\exp(2B(\rho))} + \frac{A'(\rho)C'(\rho)}{\exp(2B(\rho))} + \frac{A'(\rho)^2}{\exp(2B(\rho))} - \frac{B'(\rho)}{\rho\exp(2B(\rho))} - \frac{B'(\rho)C'(\rho)}{\exp(2B(\rho))} - \frac{A'(\rho)B'(\rho)}{\exp(2B(\rho))} + \frac{A'(\rho)}{\rho\exp(2B(\rho))} + \frac{A''(\rho)}{\exp(2B(\rho))}.$

$\boxed{G}$

$G = 2\frac{D'(\rho)C'(\rho)}{\exp(2B(\rho))} + 2\frac{C'(\rho)^2}{\exp(2B(\rho))} + 2\frac{C''(\rho)}{\exp(2B(\rho))} - 2\frac{D'(\rho)B'(\rho)}{\exp(2B(\rho))} + 4\frac{C'(\rho)}{\rho\exp(2B(\rho))} + 2\frac{D'(\rho)^2}{\exp(2B(\rho))} + 2\frac{A'(\rho)C'(\rho)}{\exp(2B(\rho))} + 2\frac{D'(\rho)}{\rho\exp(2B(\rho))} + 2\frac{A'(\rho)D'(\rho)}{\exp(2B(\rho))} + 2\frac{A'(\rho)^2}{\exp(2B(\rho))} - 2\frac{B'(\rho)}{\rho\exp(2B(\rho))} - 2\frac{B'(\rho)C'(\rho)}{\exp(2B(\rho))} - 2\frac{A'(\rho)B'(\rho)}{\exp(2B(\rho))} + 2\frac{A'(\rho)}{\rho\exp(2B(\rho))} + 2\frac{D''(\rho)}{\exp(2B(\rho))} + 2\frac{A''(\rho)}{\exp(2B(\rho))}.$

$\boxed{G^{\mu}_{\nu;\mu} = 0}$

$G^{\mu}_{0;\mu} = 0.$

$G^{\mu}_{1;\mu} = 0.$

$G^{\mu}_{2;\mu} = 0.$

$G^{\mu}_{3;\mu} = 0.$

$\boxed{g^{\mu\nu}\,\Gamma^{\lambda}_{\mu\nu} = 0?}$

$g^{\mu\nu}\,\Gamma^{0}_{\mu\nu} = 0.$

$g^{\mu\nu}\,\Gamma^{1}_{\mu\nu} = \frac{\rho^4\exp(2C(\rho))^2C'(\rho)}{\exp(2B(\rho))} + \frac{A'(\rho)\exp(2A(\rho))^2}{\exp(2B(\rho))} - \exp(2B(\rho))B'(\rho) + \frac{\exp(2D(\rho))^2D'(\rho)}{\exp(2B(\rho))} + \frac{\rho^3\exp(2C(\rho))^2}{\exp(2B(\rho))}.$

$g^{\mu\nu}\,\Gamma^{2}_{\mu\nu} = 0.$

$g^{\mu\nu}\,\Gamma^{3}_{\mu\nu} = 0.$