

Using the results derived in the lecture

$$A'^{\mu} A'_{\mu} = A'^0 A'_0, \quad \text{since } \underline{A}' = 0 \quad (\text{Eqn A})$$

$$A^{\mu} A_{\mu} = A^0 A_0 + A^1 A_1, \quad \text{since } A^2 = A^3 = 0$$

$$= (\gamma A'^0) (\gamma A'_0) + (\gamma \beta A'^0) (-\gamma \beta A'_0), \quad \begin{array}{l} \text{since } A'^0 = A'_0 \\ \text{and } A^1 = -A_1 \end{array}$$

$$= \gamma^2 (1 - \beta^2) A'^0 A'_0 = A'^0 A'_0 = A'^{\mu} A'_{\mu} \quad (\text{using Eqn(A)})$$

... as required