$$H = H_{c.p.p.} + H_{em}$$

$$= \sum_{\text{particles } i} \left\{ -(1+A_i)\left[E^i_k + e\phi_i\right] - N^\alpha_i p^i_\alpha - \frac{1}{2} E^i_k \left[\frac{1}{2}\left(\overline{\varphi}^{\alpha\beta}_i - \overline{\overline{\varphi}}^{\alpha\beta}_i\right) \frac{k^i_\alpha k^i_\beta}{(E^i_k)^2} + \frac{1}{2}\left(\overline{\varphi}^{\alpha\beta}_i + \overline{\overline{\varphi}}^{\alpha\beta}_i\right) \gamma_{\alpha\beta} \frac{(k_i)^2}{(E^i_k)^2} \right] \right\}$$

$$+ \int d^3x \left\{ -(1+A)\left[2\pi\, \gamma_{\alpha\beta}\Pi^\alpha\Pi^\beta + \frac{1}{8\pi}\gamma_{\alpha\beta}H^\alpha H^\beta + \phi\,\partial_\alpha H^\alpha\right] - N^\alpha\left[\varepsilon_{\alpha\mu\nu}H^\mu\Pi^\nu + A_\alpha\partial_\mu\Pi^\mu\right] \right.$$

$$- \frac{1}{2}\left(\overline{\varphi}^{\alpha\beta} - \overline{\varphi}^{\alpha\beta}\right)\left[2\pi\left(\delta^\alpha_\sigma\delta^\beta_\tau - \frac{1}{2}\gamma^{\alpha\beta}\gamma_{\sigma\tau}\right)\Pi_\alpha\Pi_\beta + \frac{1}{8\pi}\left(\delta^\alpha_\sigma\delta^\beta_\tau - \frac{1}{2}\gamma^{\alpha\beta}\gamma_{\sigma\tau}\right)H_\alpha H_\beta\right]$$

$$+ \frac{1}{2}\left(\overline{\overline{\varphi}}^{\alpha\beta} + \overline{\varphi}^{\alpha\beta}\right)\left[2\pi\left(\delta^\alpha_\sigma\delta^\beta_\tau - \frac{1}{2}\gamma^{\alpha\beta}\gamma_{\sigma\tau}\right)\Pi_\alpha\Pi_\beta + \frac{1}{8\pi}\left(-\delta^\alpha_\sigma\delta^\beta_\tau - \frac{1}{2}\gamma^{\alpha\beta}\gamma_{\sigma\tau}\right)H_\alpha H_\beta\right]$$

$$\left. + \overline{\overline{\varphi}}^{\beta}_{\mu}\left(\delta^\mu_\nu\delta^\alpha_\beta - \delta^\mu_\beta\delta^\alpha_\nu\right)\left[H^\nu\Pi_\alpha\right] \right\}$$

$E_k = \sqrt{m^2 + k^2}$ $\quad k^\alpha = p^\alpha - eA^\alpha$ $\quad H^\alpha = \frac{1}{2}\varepsilon^{\alpha\mu\nu}F_{\mu\nu}$

Fields with index i are evaluated @ λ_i, eg $\phi_i(t) := \phi(\lambda_i(t), t)$

Canonical momenta are $\{p^i_\alpha\}$ and Π^α, indices pulled with γ..